

**APPENDIX A**

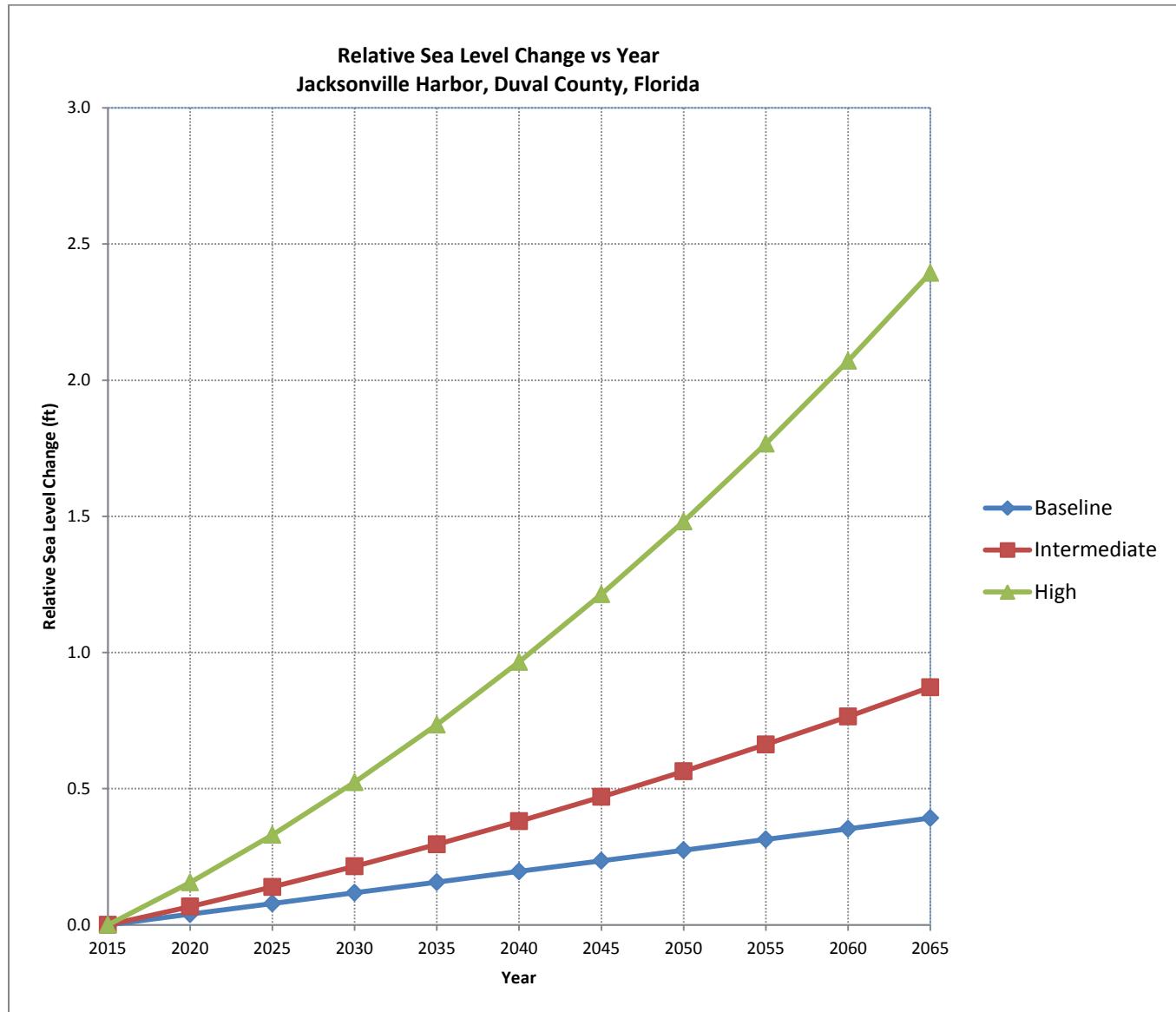
**ENGINEERING APPENDIX**

**FIGURES 1-50**

Jacksonville Harbor Navigation Study, Duval County,  
Florida

DRAFT  
INTEGRATED GENERAL REEVALUATION  
REPORT II AND SUPPLEMENTAL  
ENVIRONMENTAL IMPACT STATEMENT

**Figure 1. Sea Level Rise for Jacksonville Harbor GRR2**



CESAD-ET-CO-M (CESAJ-CO-OM/17 Oct 97) (11-2-240a) 1st End Mr. John P. DeVeaux/dsm/(404) 331-6742

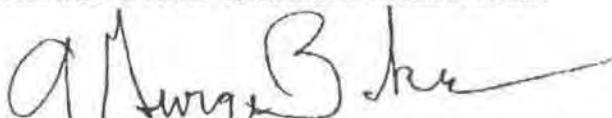
SUBJECT: Revised Request for Advance Maintenance Dredging, Barcut 3 through Terminal Channel, Station 64+56, Jacksonville Harbor, Florida

Commander, South Atlantic Division, U.S. Army Corps of Engineers, 77 Forsyth Street, S.W., Room 322, Atlanta, Georgia 30303-3490  
17 October 1997

FOR COMMANDER, JACKSONVILLE DISTRICT, ATTN: CESAJ-CO-M

1. Your request to perform advanced maintenance in subject channels is approved subject to completing all appropriate environmental documentation, coordination, and clearance.
2. You should continue to monitor the cost of maintenance to assure that the proposed advanced maintenance dredging results in the least costly method of maintaining the channel.

FOR THE DIRECTOR OF ENGINEERING AND TECHNICAL SERVICES:



A. GEORGE BAKER  
Acting Chief, Construction-Operations Division  
Directorate of Engineering and Technical Services



DEPARTMENT OF THE ARMY  
JACKSONVILLE DISTRICT CORPS OF ENGINEERS  
P. O. BOX 4970  
JACKSONVILLE, FLORIDA 32232-0019



REPLY TO  
ATTENTION OF

CESAJ-CO-OM (11-2-240a)

OCT 17 1997

MEMORANDUM FOR CDR, CESAD-ET-CO-M, Atlanta, GA 30335

SUBJECT: Revised Request for Advance Maintenance Dredging,  
Barcut 3 through Terminal Channel, Station 64+56, Jacksonville  
Harbor, Florida

1. References:

- a. CESAJ-CO-OM memo dated 21 July 1997.
- b. Conference call of 15 October 1997 between Mr. John Deveaux, Mr. Gerald Melton, Mr. Dan Beasley, and Mr. John Bearce.
- c. Enclosed revised cost analysis (copy faxed to CESAD during conference call referenced above).

2. This memo is a revision of original request for advance maintenance (reference 1.a.) based on several items that were discussed during conference call, reference 1.b.

3. Purpose: To obtain approval for advance maintenance of Barcut 3 through Terminal Channel, not to include the Terminal Channel beyond Sta. 64+56 or Cuts A-G. Further analysis of Jacksonville Harbor has revealed that better safety conditions and economic savings can be achieved with an additional 2 feet of required dredging. The advance maintenance is requested only to provide for better management of O&M dredging in Jacksonville Harbor; it is **not** intended to provide for larger and/or deeper draft vessels. Therefore, clearances between vessel keels and the channel bottom, whether soft mud or exposed rock, will be increased and risk of vessel grounding will be decreased.

CESAJ-CO-OM

SUBJECT: Request for Advance Maintenance Dredging, Barcut 3 through Terminal Channel, Station 64+56, Jacksonville Harbor, Florida

4. History: Jacksonville Harbor is authorized to a depth of -38 feet MLLW, except Barcut 3, Sta. 0+00-210+00 (-42 feet). Maintenance dredging has been performed in the channel twenty-one times in the past twenty years. Shoaling rates, with the exception of Cut 42, have remained consistent, at approximately 1.5 feet and 664,000 cubic yards per year. The main channel has been partitioned into four segments for scheduling purposes (Enclosure 1).

Due to funding limitations, we have been unable to dredge the entire channel each year. Previous guidance on utilization of the required dredging prism allowed us to require dredging of overdepth as advance maintenance. This guidance enabled us to dredge certain segments of the channel every third year rather than every year or every other year. The exception to this is Cut 42 which is maintained annually and sometimes biannually. This cut has recently been approved for two feet of advance maintenance.

5. Current: The dredging schedule has remained on an annual cycle where a third of the channel is dredged each year. However, if advance maintenance is not approved for this project the entire channel will have to be dredged on an annual basis to provide the user project depth 90% of the time. Dredging to required depths greater than project depth is no longer practiced. Any shoaling occurring in the three years following maintenance immediately places the channel at a restricted project depth. At this time we are not achieving our goal of maintaining project depths on a consistent basis. The Jacksonville Port Authority is becoming increasingly dissatisfied because of our inability to maintain the project depths throughout the year.

Adding to the problem is that it has become routine practice for contractors to dredge to the project depth and only minimally dredge the 2 feet of allowable overdepth. This practice allows shoaling to occur above project depth within a few months following maintenance. Advance maintenance will allow the

CESAJ-CO-OM

SUBJECT: Request for Advance Maintenance Dredging, Barcut 3 through Terminal Channel, Station 64+56, Jacksonville Harbor, Florida

District to require the contractor to dredge that additional depth. The shoaling above project depth can be minimized for a much longer period.

6. Situation: It is currently inefficient and uneconomical to dredge the 1.5 feet of shoal material over the whole channel to project depth every year. Unfortunately, the shoals can develop up to 4.5 feet above project depth over a three year period. Dredging the requested 2 feet of advance maintenance would translate into only 2.5 feet of shoal above project depth by the third year of the dredging cycle. This is a much more acceptable situation than the 4.5 feet that occurs in some areas by the third year.

a. The initial cost for 2 feet of advance maintenance will be spread over three years. The mobilization costs will be distributed over more cubic yardage and the contractor's production rate is greatest with the greater bank heights. Every foot of restriction attributed to shoaling above project depth equates to significant dollars lost to the Jacksonville Port Authority. Traffic using the channel needs full project depth. Because commercial users contribute to the *Harbor Maintenance Trust Fund*, they expect to have full project depth most of the time, if not all of the time.

b. This District has only two options for satisfactorily maintaining Jacksonville Harbor. The first option is to dredge the entire channel to project depth each year. The second option is to dredge with 2 feet of advance maintenance, as is done in other deep draft harbors, such as Mobile Harbor. The second option, advance maintenance, is the option that allows the District to dredge the most economically. Enclosure 2 is a cost analysis comparing the two options, dredging with and without advance maintenance.

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SUBJECT: Request for Advance Maintenance Dredging, Barcut 3 through Terminal Channel, Station 64+56, Jacksonville Harbor, Florida

7. Recommendation: Advance maintenance dredging will allow the District increased ability to provide the Navigation Performance Measurement goal set for Jacksonville Harbor. The performance measurement goal is to provide project depth of -38 feet 90% of the time. Current level of performance is below the 90% level with shoaling always occurring within the -38-foot depth in lieu of the advance maintenance section. Advance maintenance dredging will also limit the potential for navigation hazards, achieve consistent depths for the Port Authority, and more importantly it will save Government resources. We recommend that authorization be granted to allow 2 feet of advance maintenance in Jacksonville Harbor from Barcut 3 through Terminal Channel, Sta. 64+56 and allow four feet of advance maintenance throughout Cut 42. Advance Maintenance is the most cost effective method of keeping the channel navigable and safe.

8. Project Manager and point of contact for this project is Patricia Hanson, 904-232-1640.

FOR THE COMMANDER:

Encls

  
GIRALAMO DICHIARA  
Chief, Construction-Operations  
Division

**DREDGING COSTS FOR ADVANCE MAINTENANCE, CUTS 3-55**

**JACKSONVILLE HARBOR, FLORIDA**

**revised 15 Oct 1997**

Shown below are the simplified costs of dredging the channel with and without advance maintenance. The advance maintenance costs are spread over 3 years, as based on current dredging schedules. In effort to simplify this cost analysis, several factors were not incorporated into the unit cost figures. Additional costs associated with extended pipelines, booster pumps, environmental concerns, etc., were not considered. Accordingly, the actual project costs will be higher than what is shown in this spreadsheet, but the savings will also be higher than what is shown. The unit costs were derived from the Cost Engineering Dredge Estimating Program (CEDEP) for a 30" Pipeline dredge and vary based on the bank heights which affect the dredge's overall production rate.

**With Advance Maintenance Costs:**

**Cycle 1**

	shoal quantity (cy)	adv maint (cy)	total bank ht.* (ft)	unit cost per cy	cost
<b>YEAR 1</b>					
Dredging Segment 3 (Cut 42)	328,000	150,000	6.0	\$1.30	\$621,400
Dredging Segment 1 (Barcut 3 - Cut 6)	525,000	250,000	6.5	\$1.20	\$930,000
Total Dredging Costs:					\$1,551,400

**YEAR 2**

Dredging Segment 3 (Cut 42)	178,000	150,000	4.0	\$2.34	\$767,520
Dredging Segment 2 (Cuts 7 - 41)	304,000	100,000	6.5	\$1.20	\$484,800
Total Dredging Costs:					\$1,252,320

**YEARS 3**

Dredging Segment 3 (Cut 42)	178,000	150,000	4.0	\$2.34	\$767,520
Dredging Segment 4 (Cuts 43 - 55)	425,000	112,000	6.5	\$1.20	\$644,400
Total Dredging Costs:					\$1,411,920

**Cycle 2**

**YEAR 4**

Dredging Segment 3 (Cut 42)	178,000	150,000	4.0	\$2.34	\$767,520
Dredging Segment 1 (Barcut 3 - Cut 6)	275,000	250,000	4.5	\$2.07	\$1,086,750
Total Dredging Costs:					\$1,854,270

**YEAR 5**

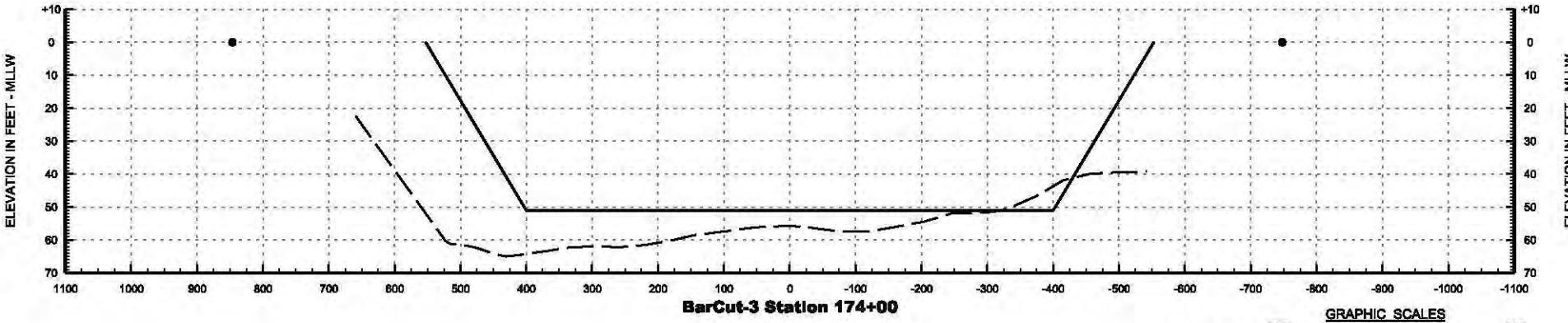
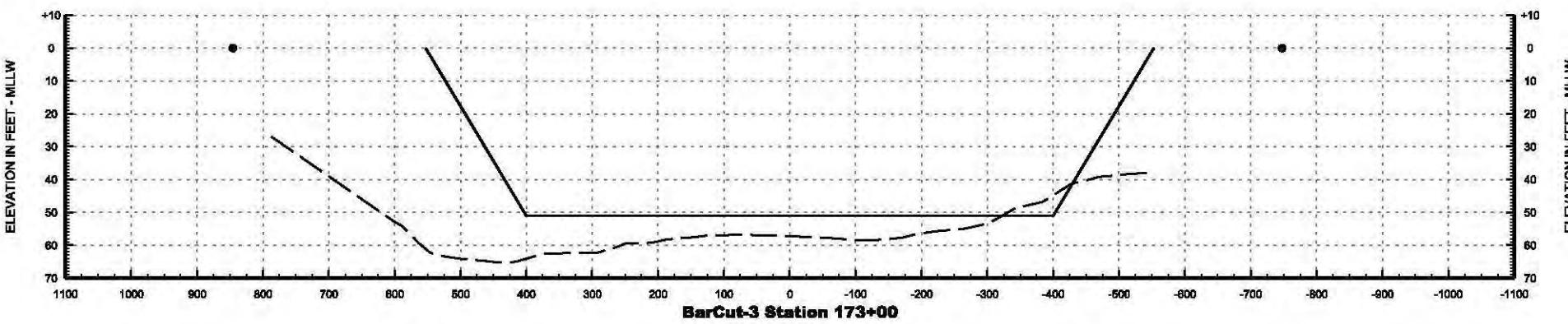
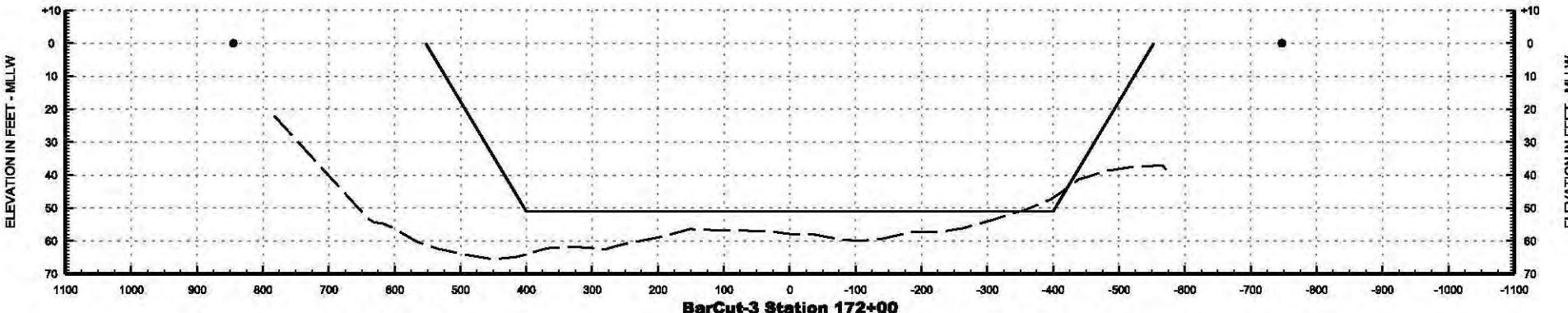
Dredging Segment 3 (Cut 42)	178,000	150,000	4.0	\$2.34	\$767,520
Dredging Segment 2 (Cuts 7 - 41)	128,000	100,000	4.5	\$2.07	\$471,960
Total Dredging Costs:					\$1,239,480

**YEAR 6**

Dredging Segment 3 (Cut 42)	178,000	150,000	4.0	\$2.34	\$767,520
Dredging Segment 4 (Cuts 43 - 55)	143,000	112,000	4.5	\$2.07	\$527,850
Total Dredging Costs:					\$1,295,370

Without Advance Maintenance Costs:			revised 15 Oct 1997		
	shoal quantity	adv maint	total	unit cost	
YEAR 1	(cy)	(cy)	(ft)	per cy	cost
Dredging Segment 1 (Barcut 3 - Cut 6)	525,000	0	4.5	\$2.07	\$1,086,750
Dredging Segment 2 (Cuts 7 - 41)	228,000	0	4.5	\$2.07	\$471,960
Dredging Segment 3 (Cut 42)	328,000	0	4.0	\$2.34	\$767,520
Dredging Segment 4 (Cuts 43 - 55)	255,000	0	4.5	\$2.07	\$527,850
Total Dredging Costs:					\$2,854,080
YEARS 2 - 12					
Dredging Segment 1 (Barcut 3 - Cut 6)	175,000	0	1.5	\$3.71	\$649,250
Dredging Segment 2 (Cuts 7 - 41)	76,000	0	1.5	\$3.71	\$281,960
Dredging Segment 3 (Cut 42)	328,000	0	1.5	\$3.71	\$1,216,880
Dredging Segment 4 (Cuts 43 - 55)	85,000	0	1.5	\$3.71	\$315,350
Total Dredging Costs:					\$2,463,440
	Without	With			
Costs over a 12 year period:	Adv Maint	Adv Maint			
Year 1	\$2,854,080	\$1,551,400			
Year 2	\$2,463,440	\$1,252,320			
Year 3	\$2,463,440	\$1,411,920			
Year 4	\$2,463,440	\$1,854,270			
Year 5	\$2,463,440	\$1,239,480			
Year 6	\$2,463,440	\$1,295,370			
Year 7	\$2,463,440	\$1,854,270			
Year 8	\$2,463,440	\$1,239,480			
Year 9	\$2,463,440	\$1,295,370			
Year 10	\$2,463,440	\$1,854,270			
Year 11	\$2,463,440	\$1,239,480			
Year 12	\$2,463,440	\$1,295,370			
Total at end year 12:	\$29,951,920	\$17,383,000			
Average cost savings per year:	\$1,047,410				

\* Bank height of 6.5 feet is the sum of 4.5 feet of shoal and 2-feet of advance maintenance.



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



US Army Corps of Engineers  
Jacksonville District

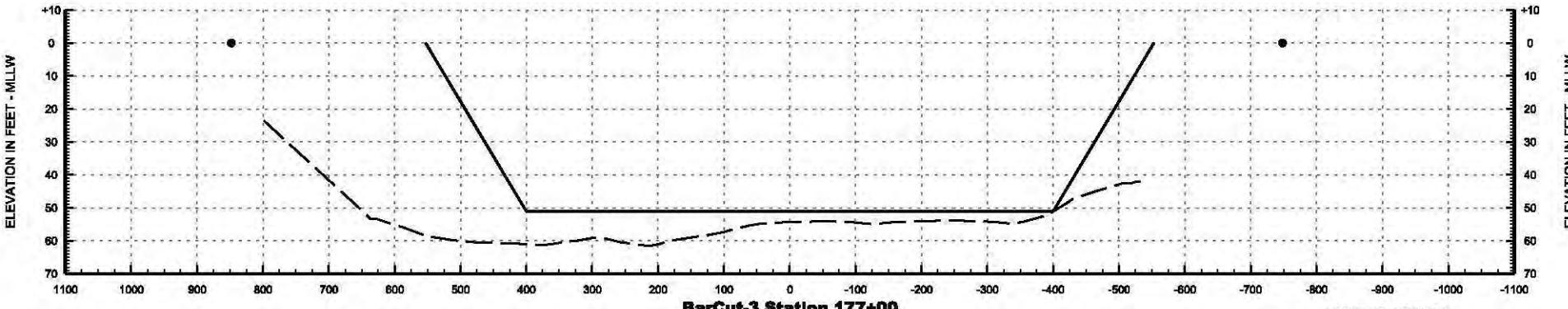
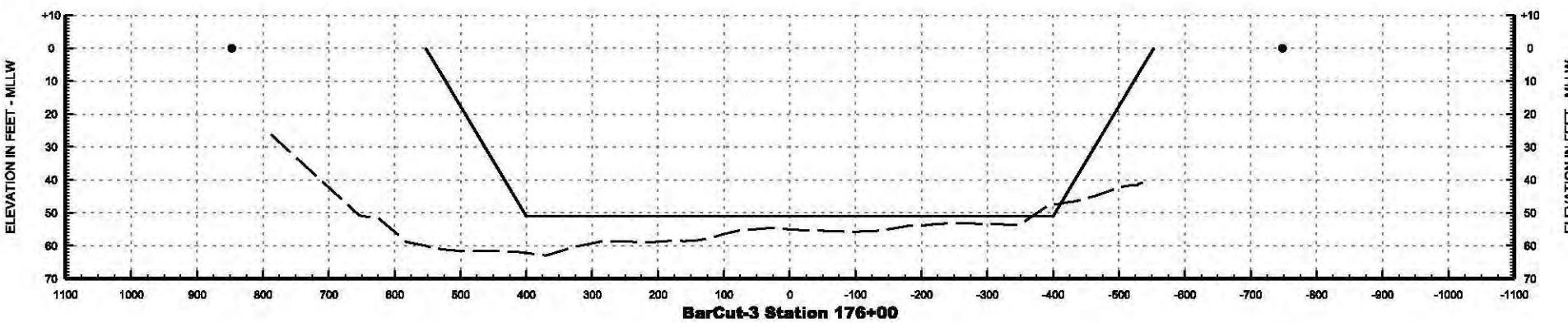
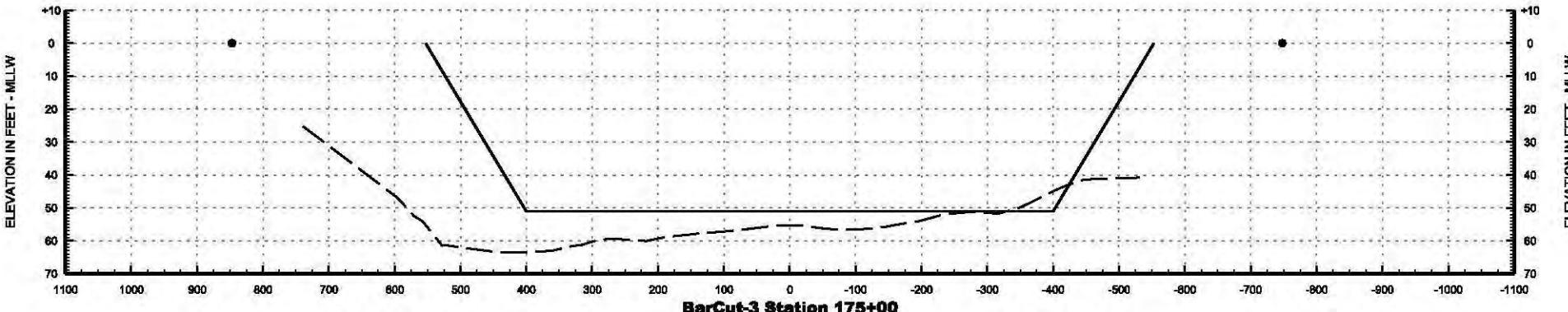
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JACKSONVILLE HARBOR NAVIGATION PROJECT  
DUVAL COUNTY, FLORIDA  
DREDGING CROSS SECTIONS  
BARCUT-3 STATION 172+00 TO 174+00  
GENERAL REEVALUATION REPORT II - ENGINEERING APPENDIX

\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

FIGURE  
**3**



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



US Army Corps of Engineers  
Jacksonville District

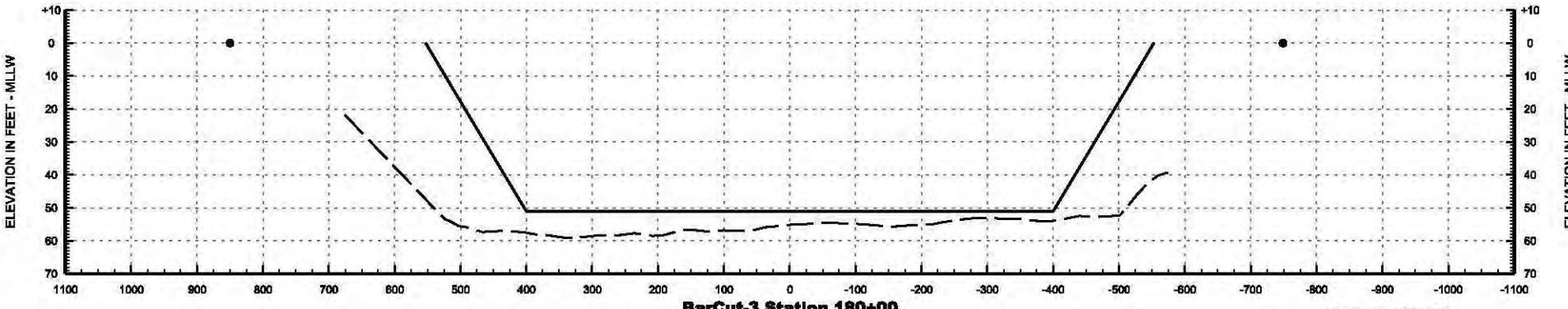
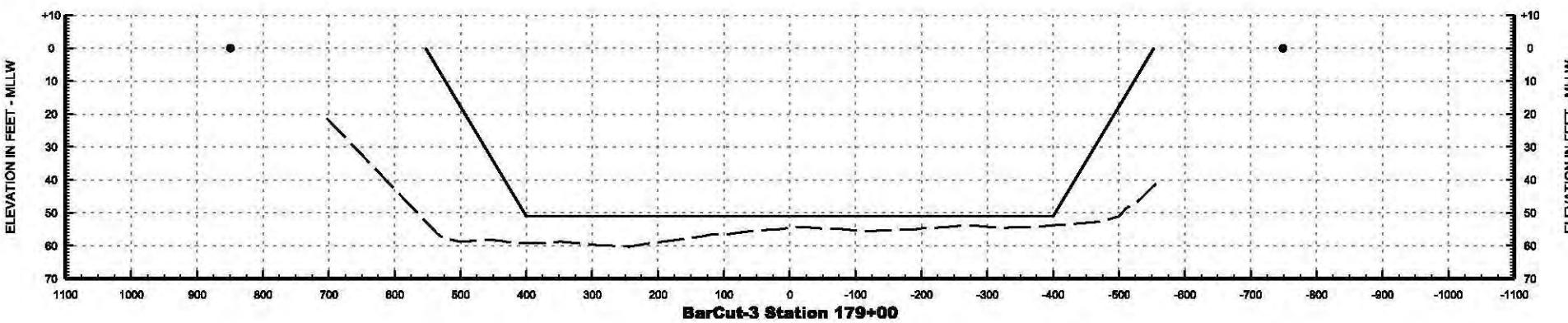
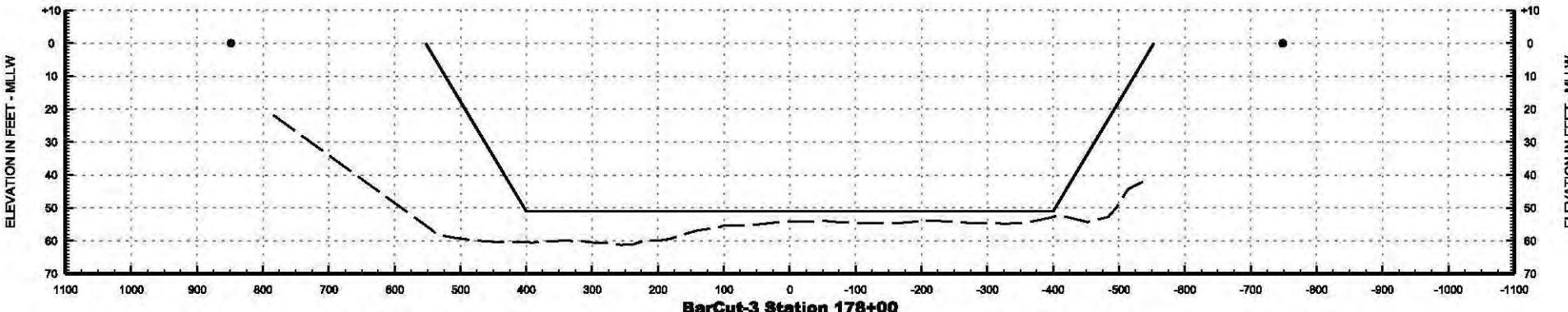
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DREDGING CROSS SECTIONS  
BARCUT-3 STATION 175+00 TO 177+00  
GENERAL REEVALUATION REPORT II - ENGINEERING APPENDIX

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— EXISTING GROUND  
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FIGURE  
4



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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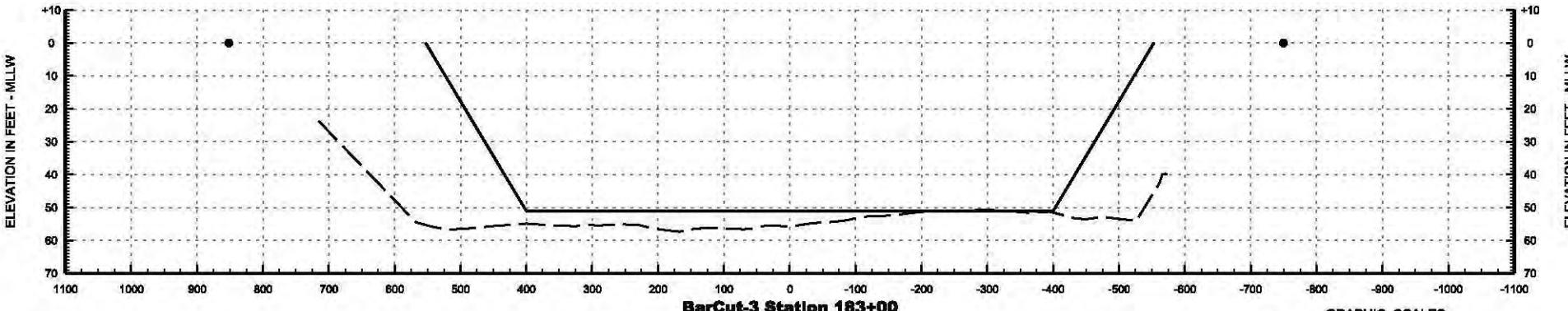
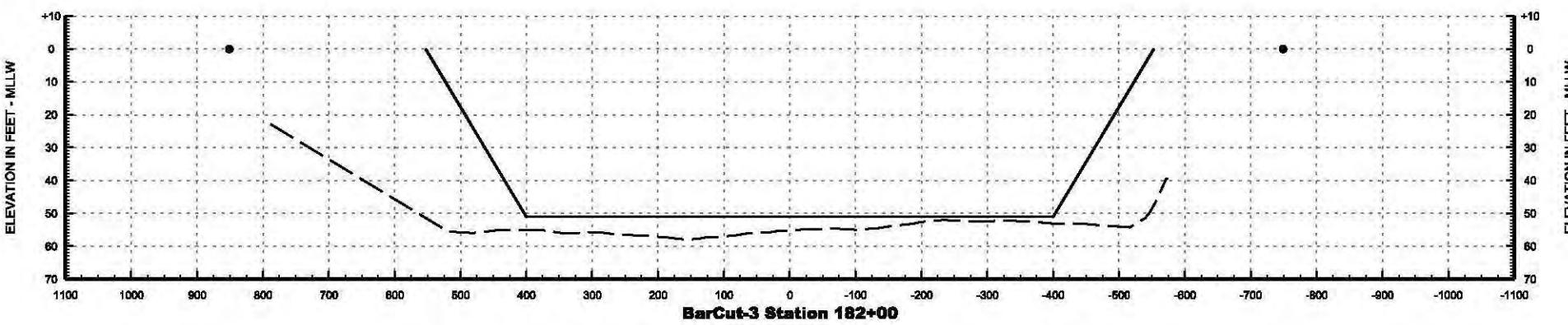
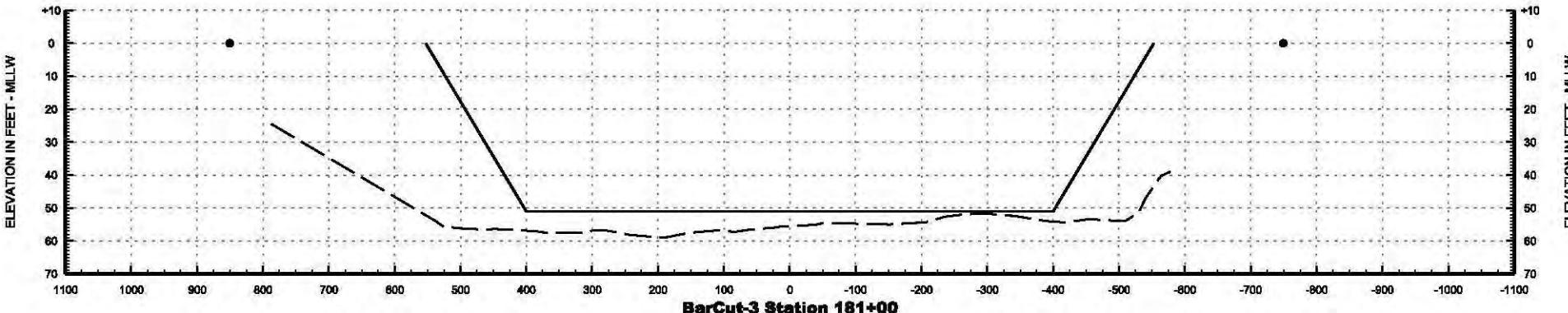
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DREDGING CROSS SECTIONS  
BARCUT-3 STATION 178+00 TO 180+00  
GENERAL REEVALUATION REPORT II - ENGINEERING APPENDIX

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— DREDGE TEMPLATE  
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FIGURE  
**5**



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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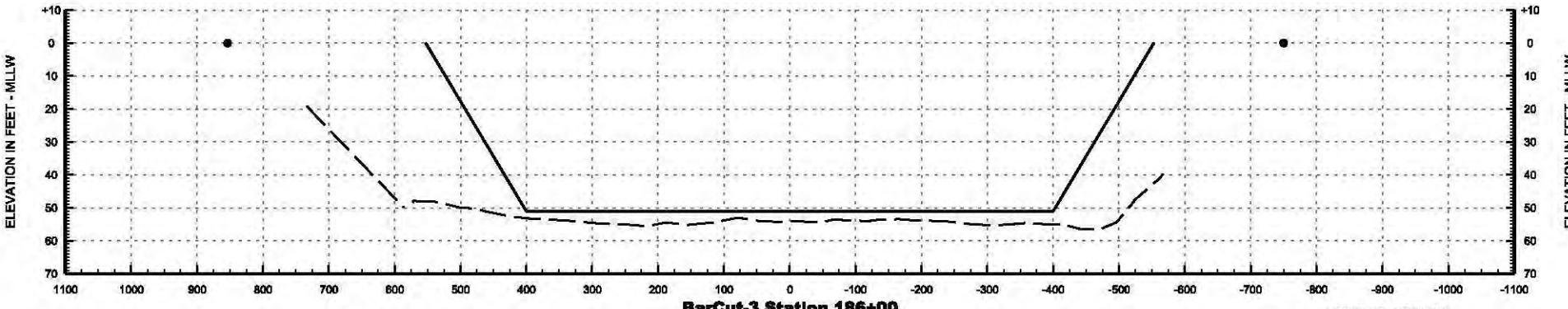
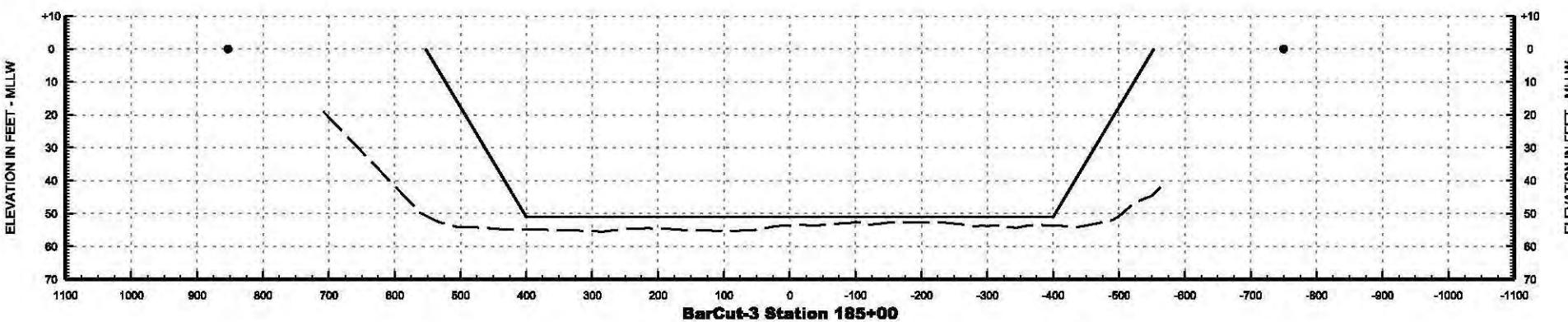
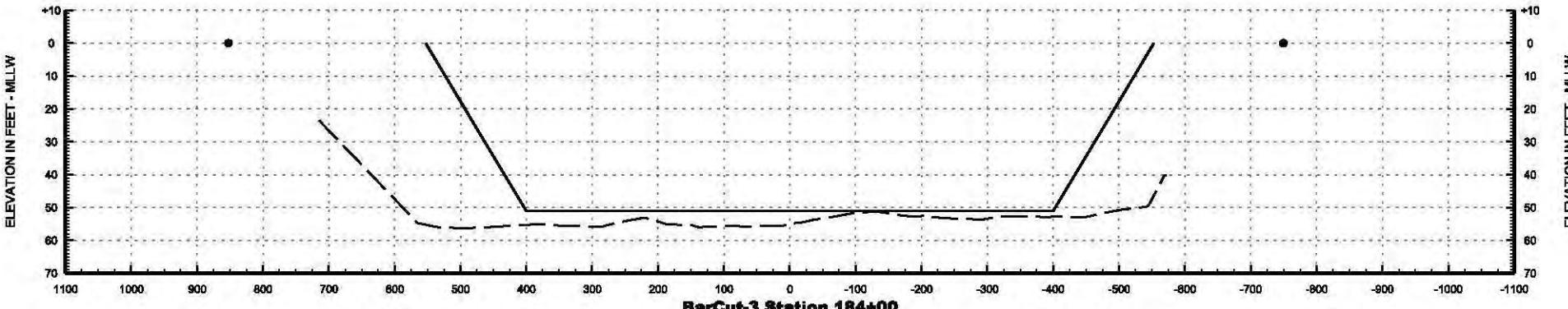
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DUVAL COUNTY, FLORIDA  
DREDGING CROSS SECTIONS  
BARCUT-3 STATION 181+00 TO 183+00  
GENERAL REEVALUATION REPORT II - ENGINEERING APPENDIX

\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
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FIGURE  
**6**



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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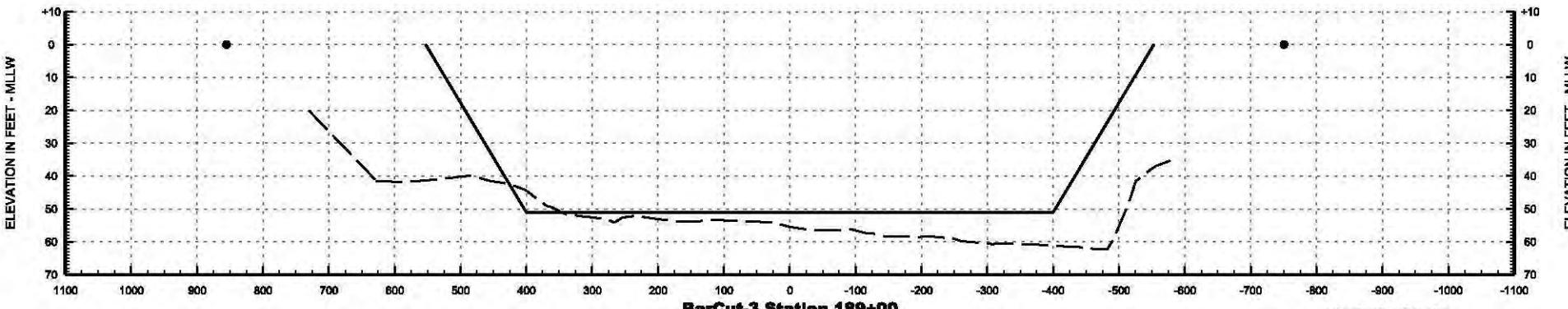
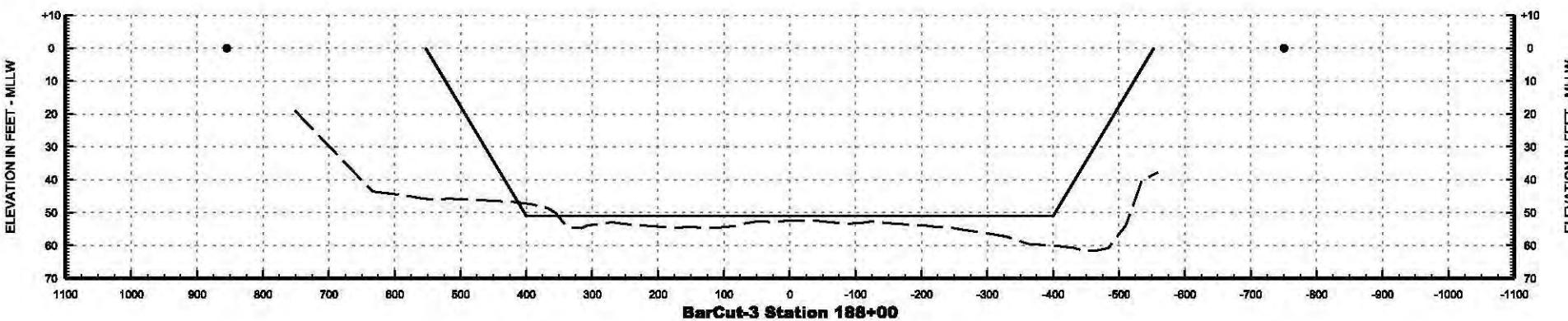
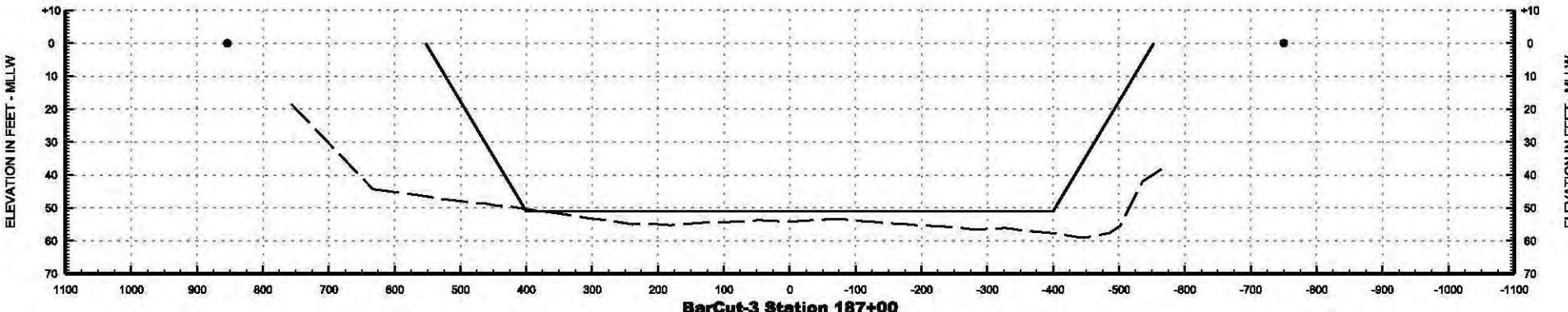
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JACKSONVILLE HARBOR NAVIGATION PROJECT  
DUVAL COUNTY, FLORIDA  
DREDGING CROSS SECTIONS  
BARCUT-3 STATION 184+00 TO 186+00  
GENERAL REEVALUATION REPORT II - ENGINEERING APPENDIX

\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

FIGURE  
7



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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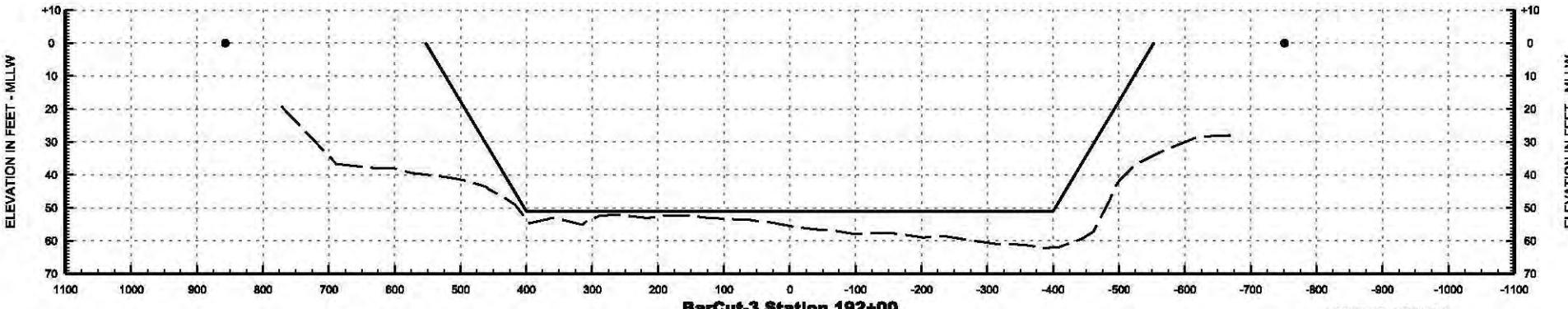
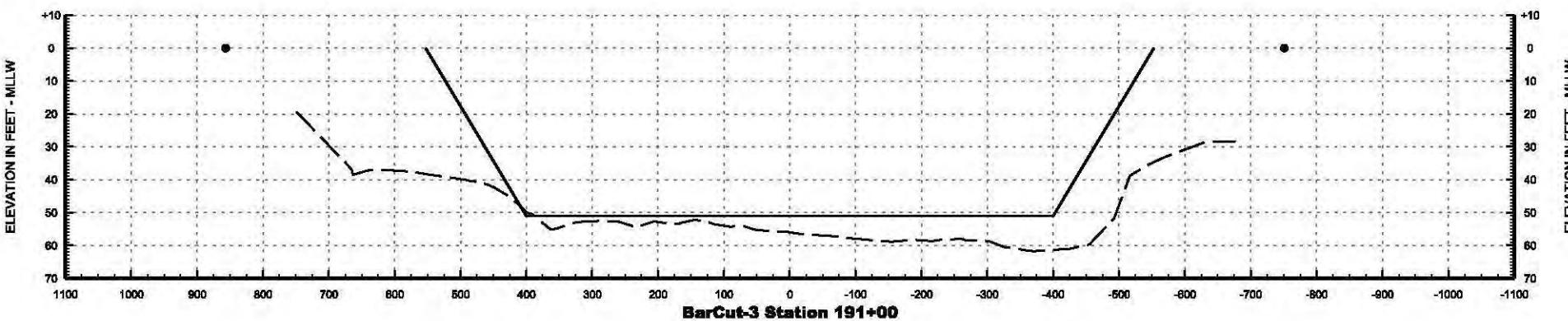
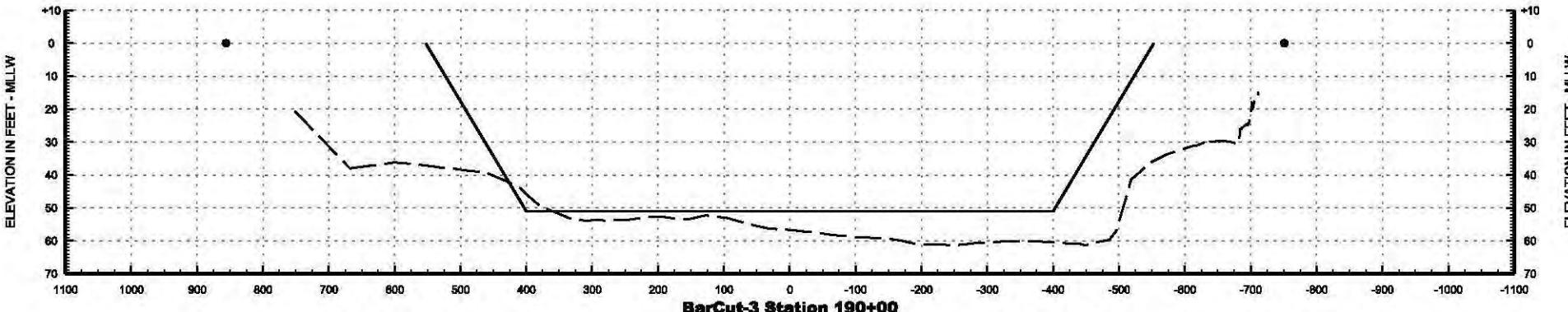
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DUVAL COUNTY, FLORIDA  
DREDGING CROSS SECTIONS  
BARCUT-3 STATION 187+00 TO 189+00  
GENERAL REEVALUATION REPORT II - ENGINEERING APPENDIX

● APPROXIMATE SHORELINE  
— Existing Ground  
— Dredge Template  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

8

FIGURE



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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Jacksonville District

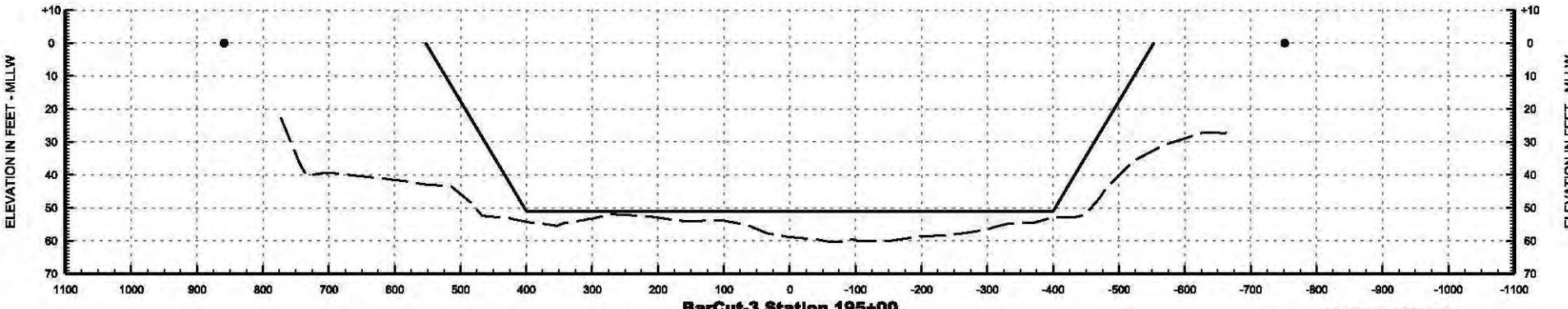
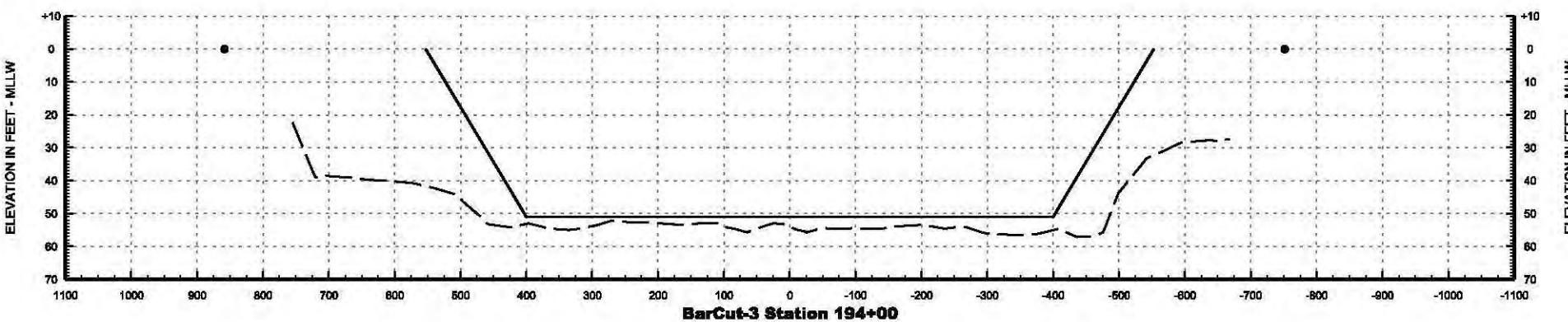
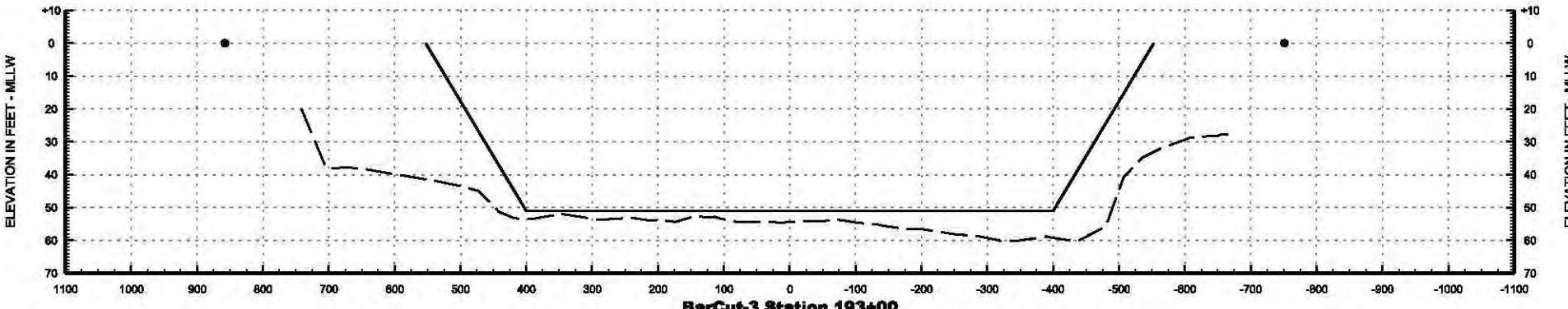
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JACKSONVILLE HARBOR NAVIGATION PROJECT  
DUVAL COUNTY, FLORIDA  
DREDGING CROSS SECTIONS  
BARCUT-3 STATION 190+00 TO 192+00  
GENERAL REEVALUATION REPORT II - ENGINEERING APPENDIX

● APPROXIMATE SHORELINE  
— EXISTING GROUND  
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FIGURE  
**9**



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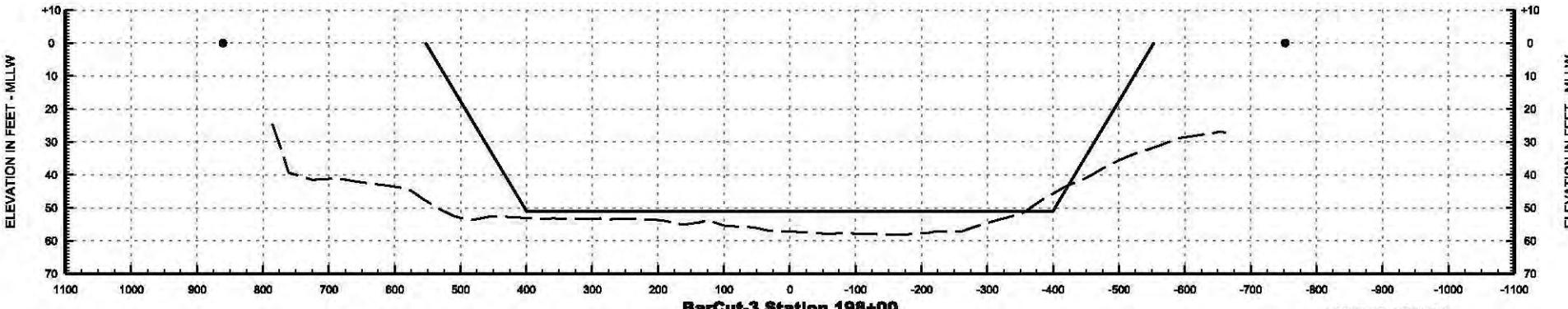
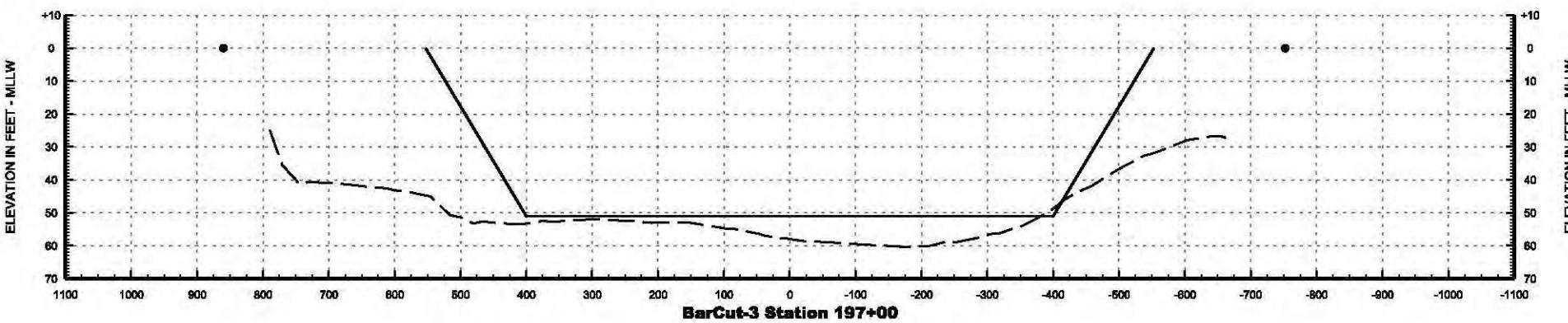
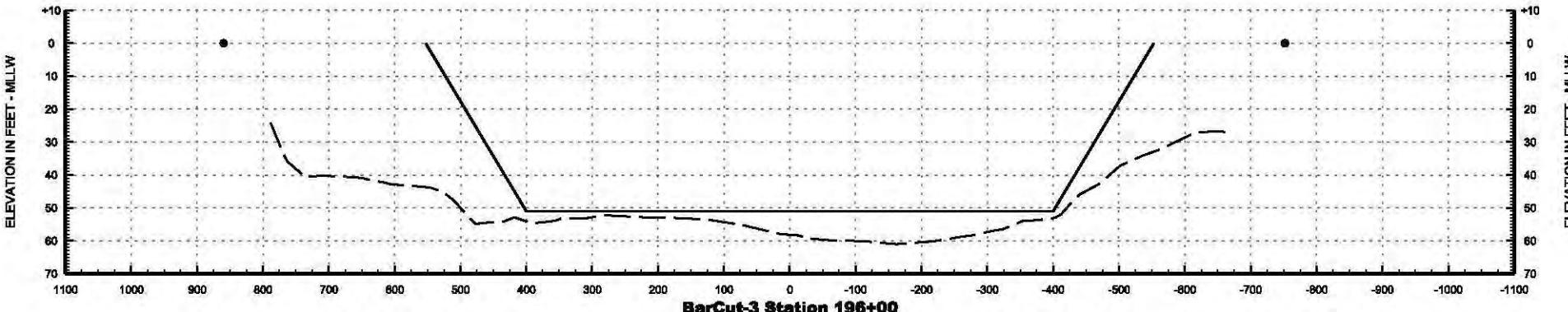
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JACKSONVILLE HARBOR NAVIGATION PROJECT  
DUVAL COUNTY, FLORIDA  
DREDGING CROSS SECTIONS  
BARCUT-3 STATION 193+00 TO 195+00  
GENERAL REEVALUATION REPORT II - ENGINEERING APPENDIX

\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

FIGURE  
**10**



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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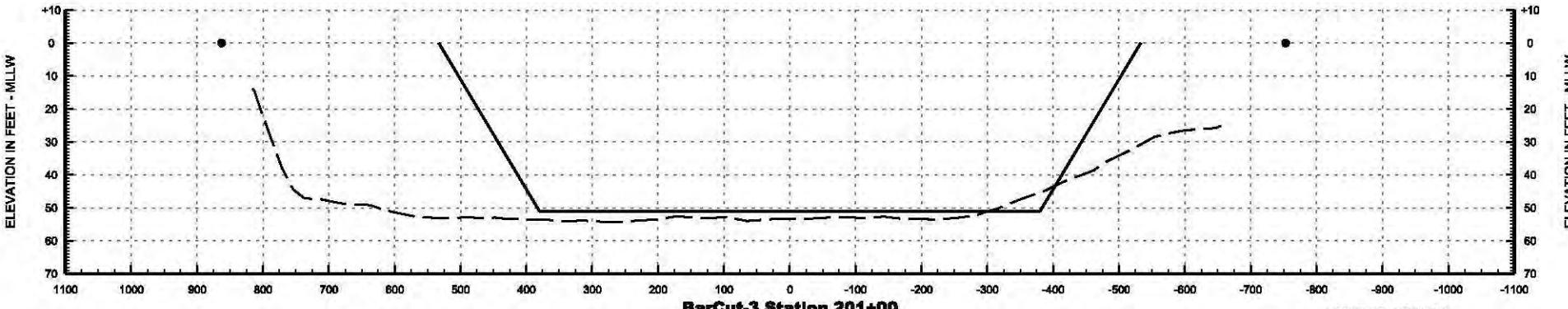
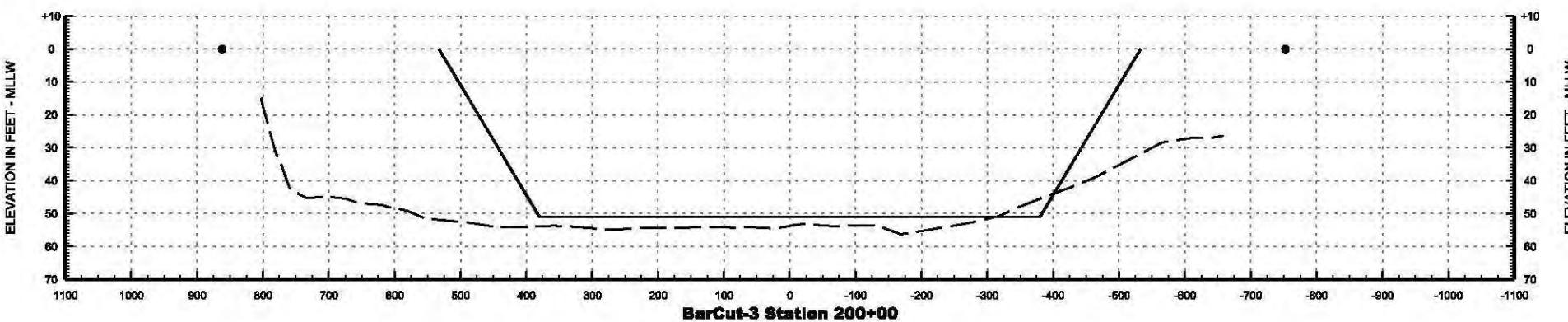
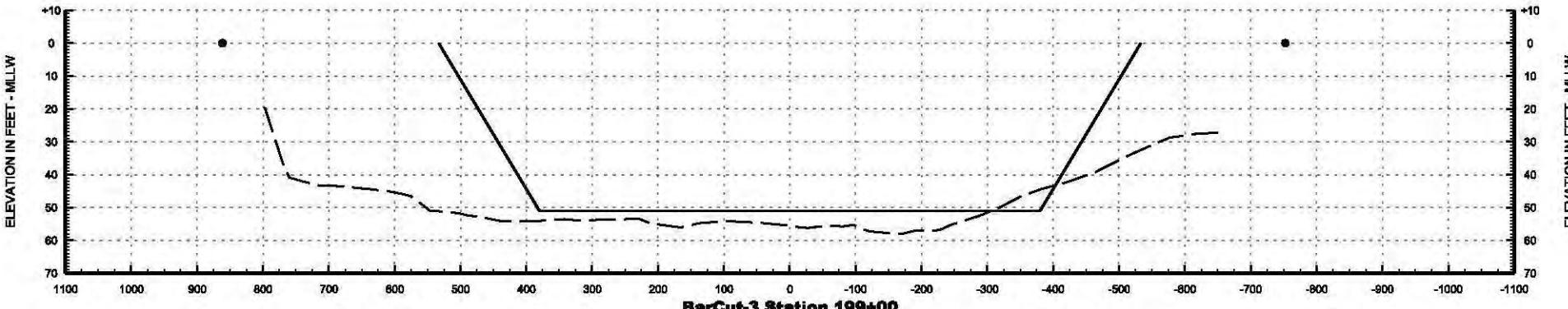
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\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

FIGURE  
11



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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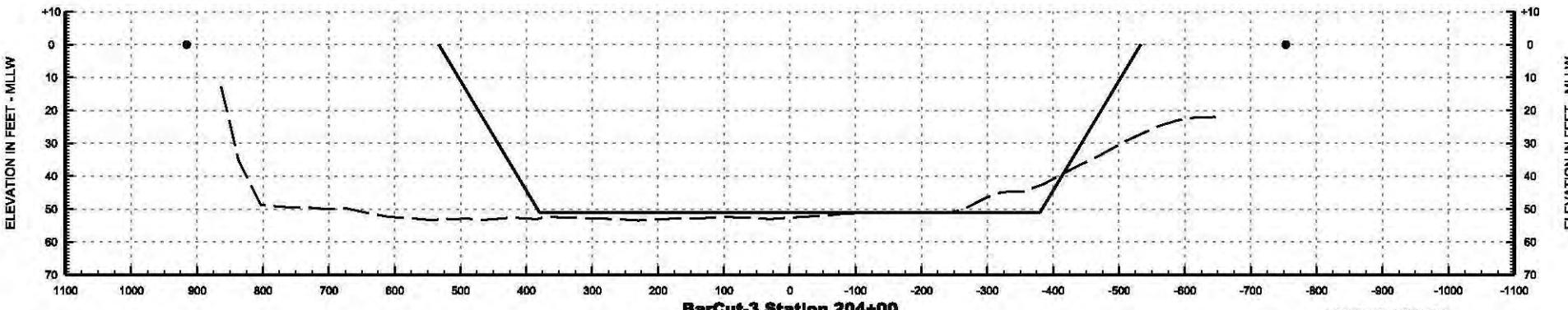
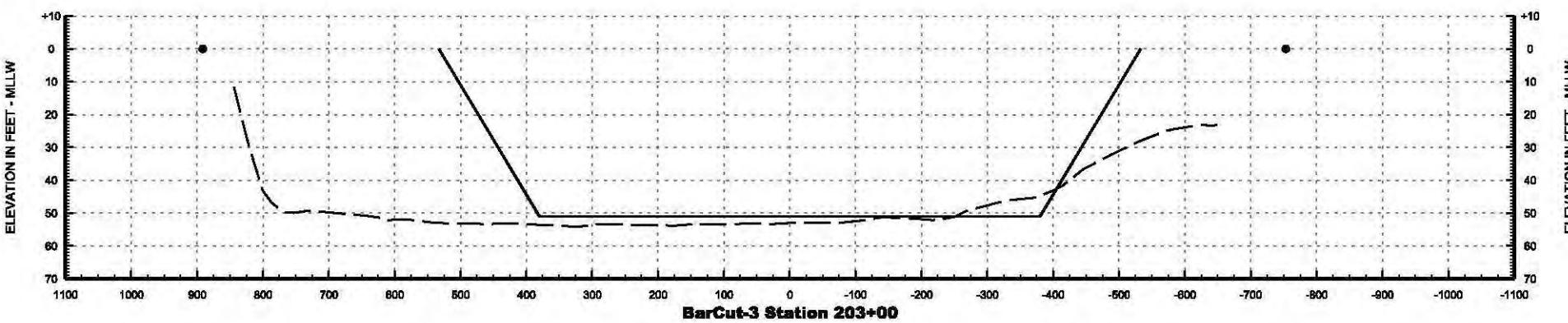
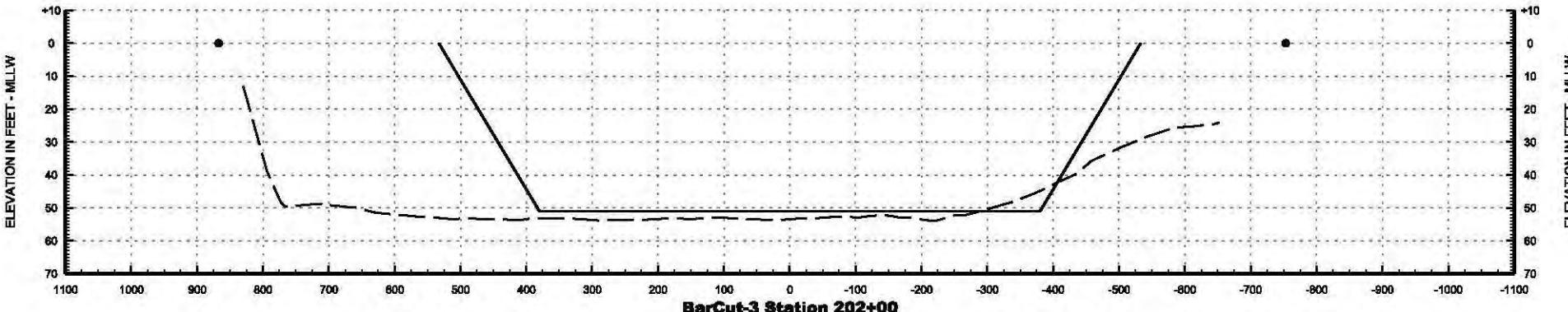
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● APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

**12**

**FIGURE**



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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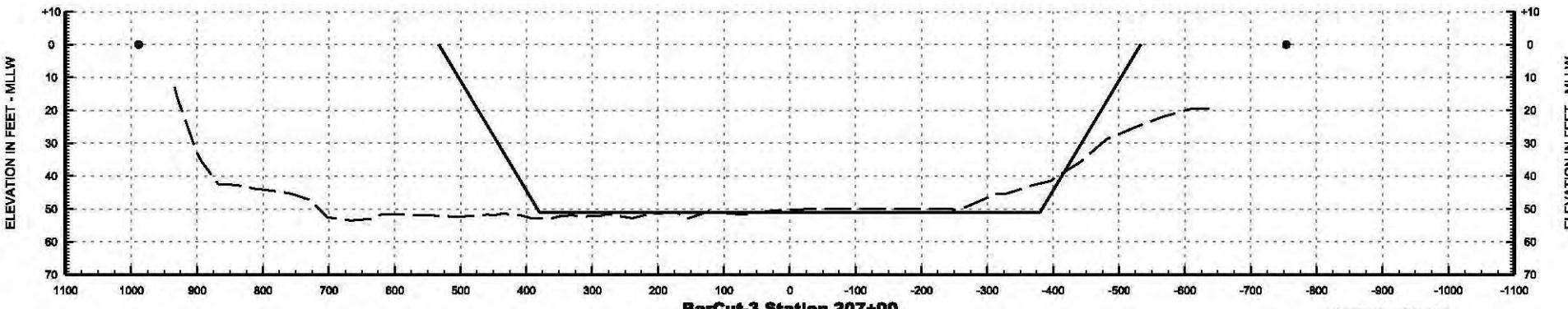
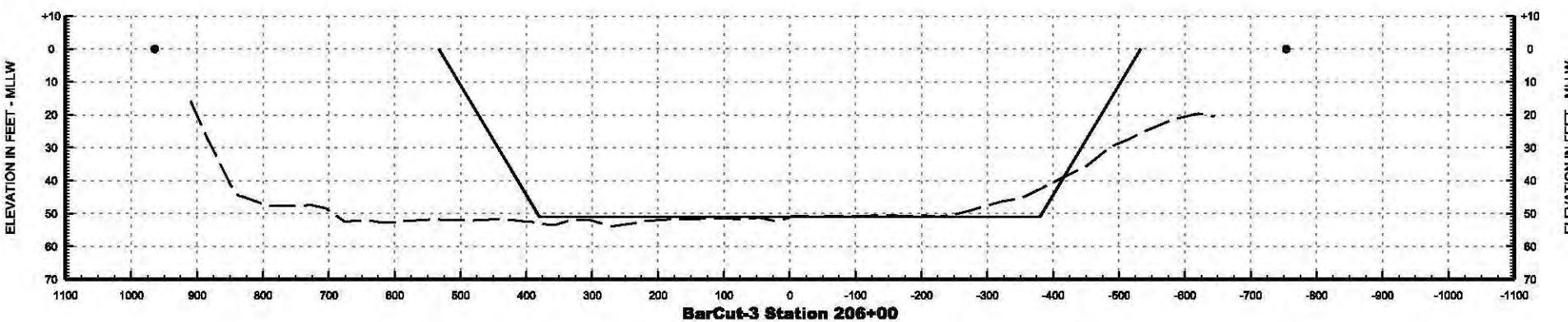
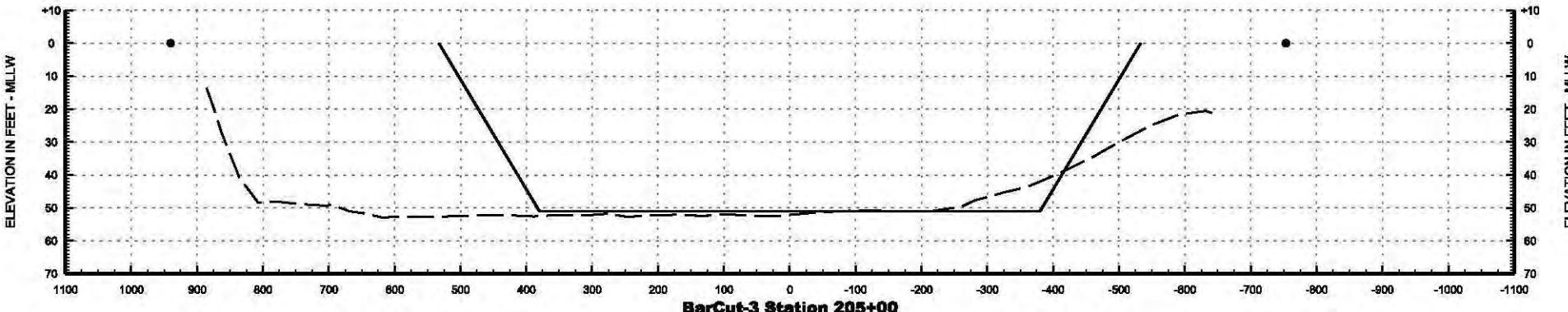
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\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

FIGURE  
13



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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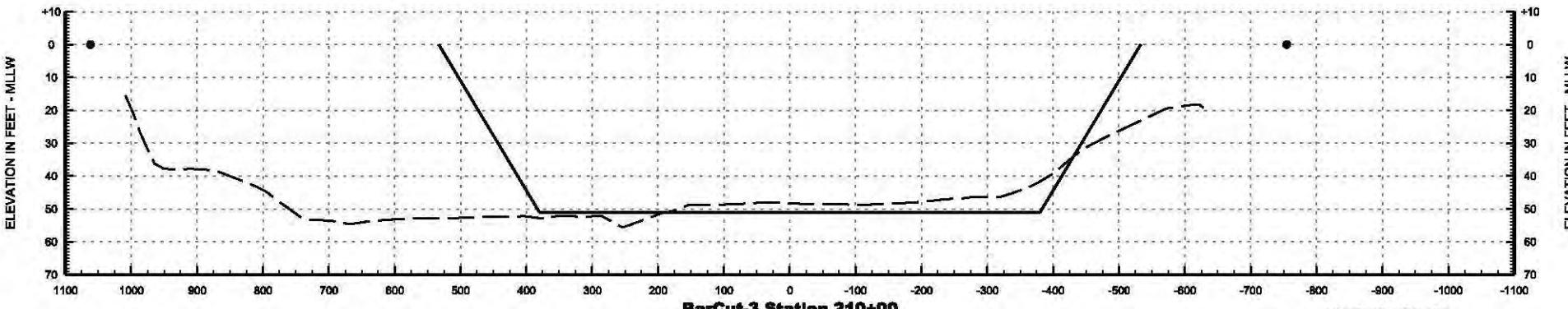
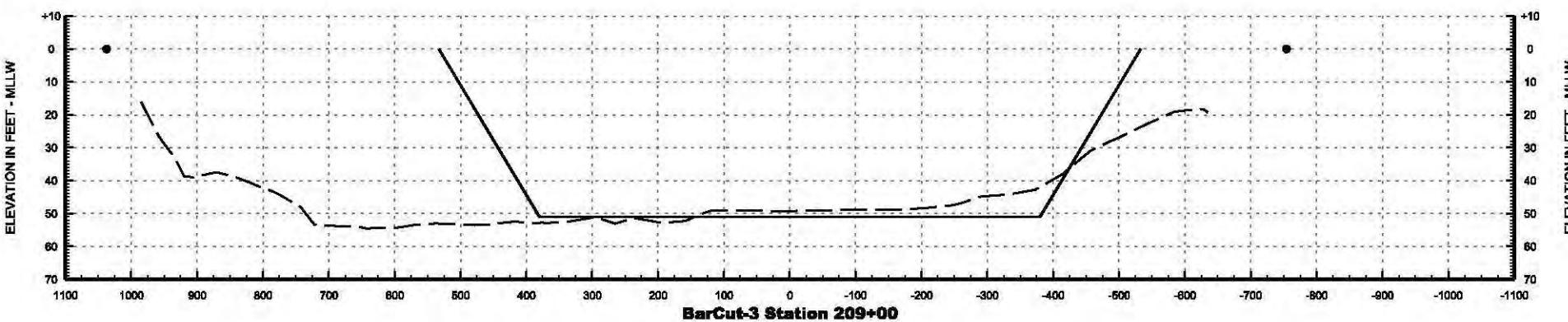
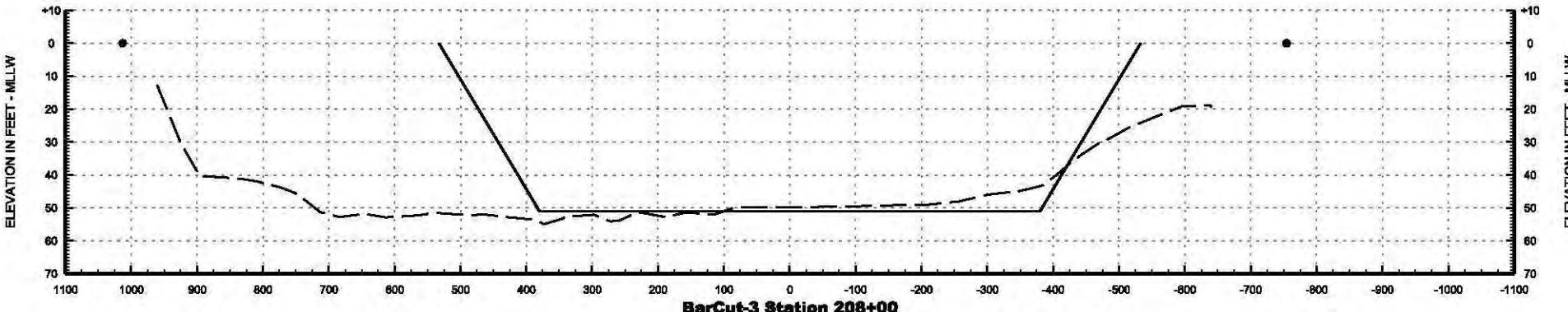
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\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

14

FIGURE



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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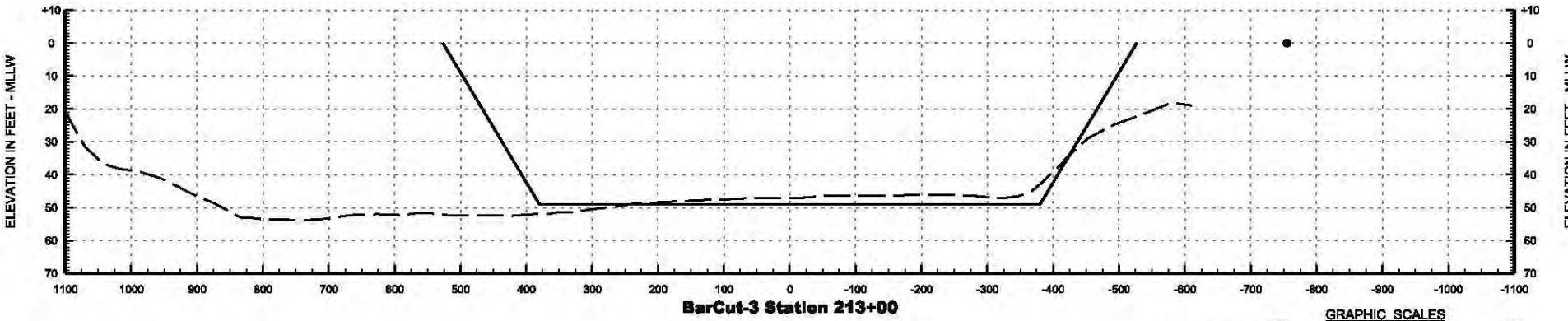
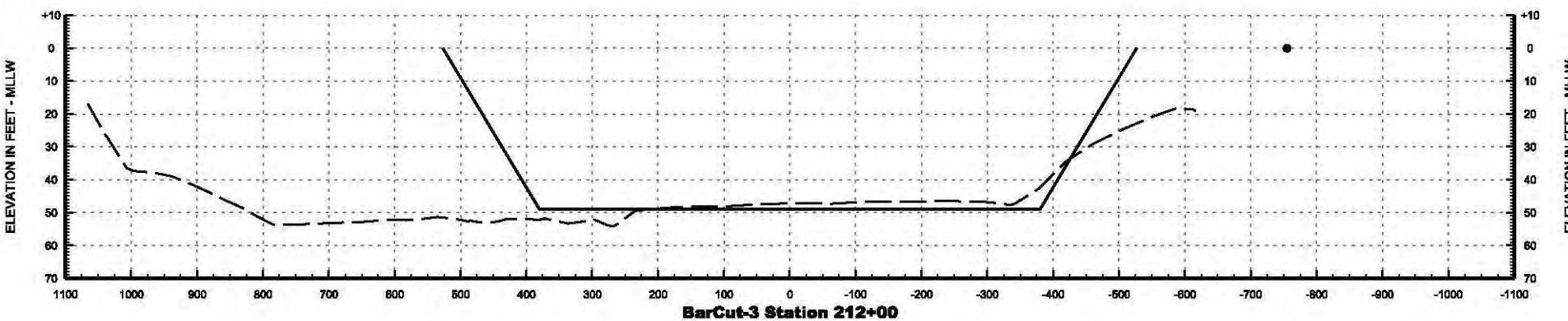
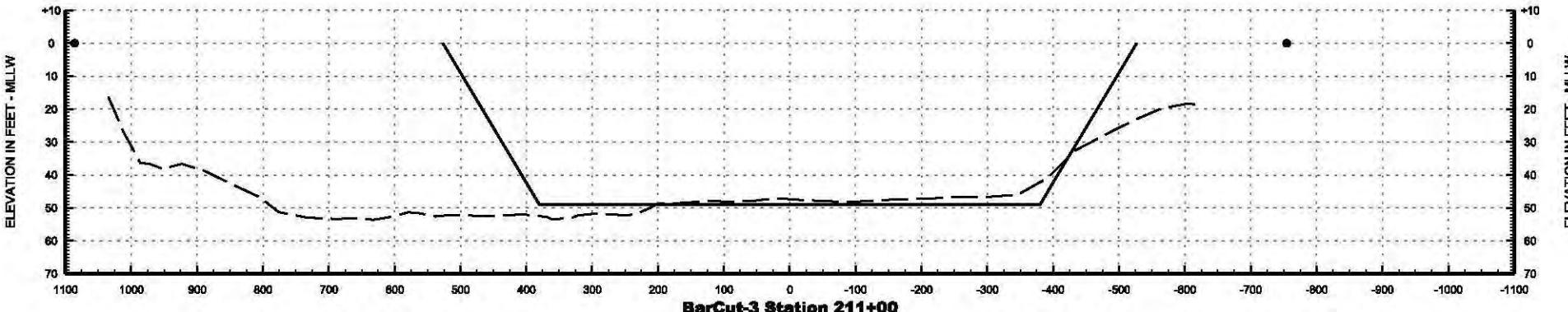
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\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

FIGURE  
15



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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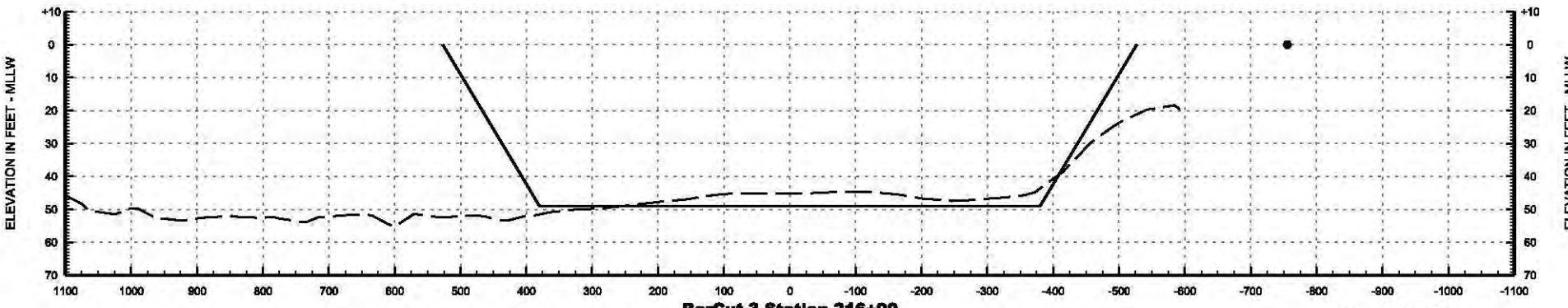
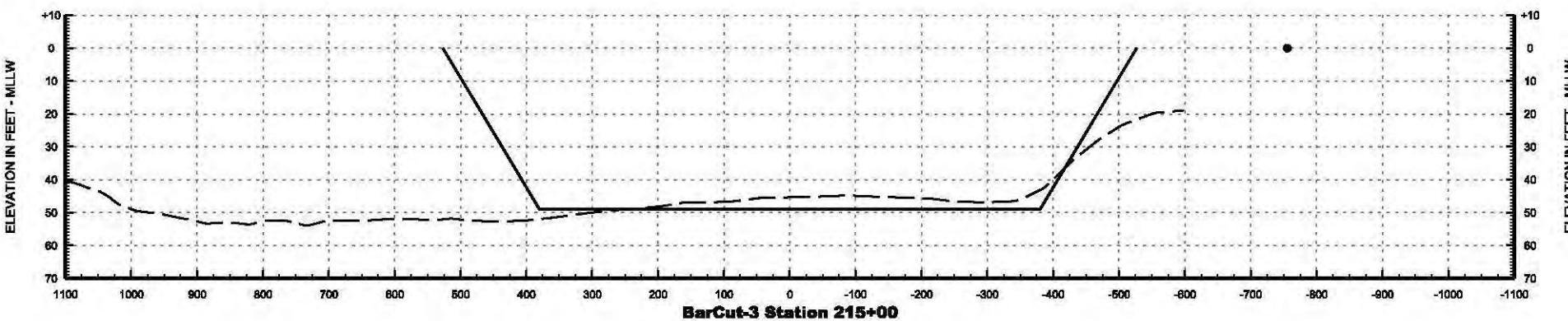
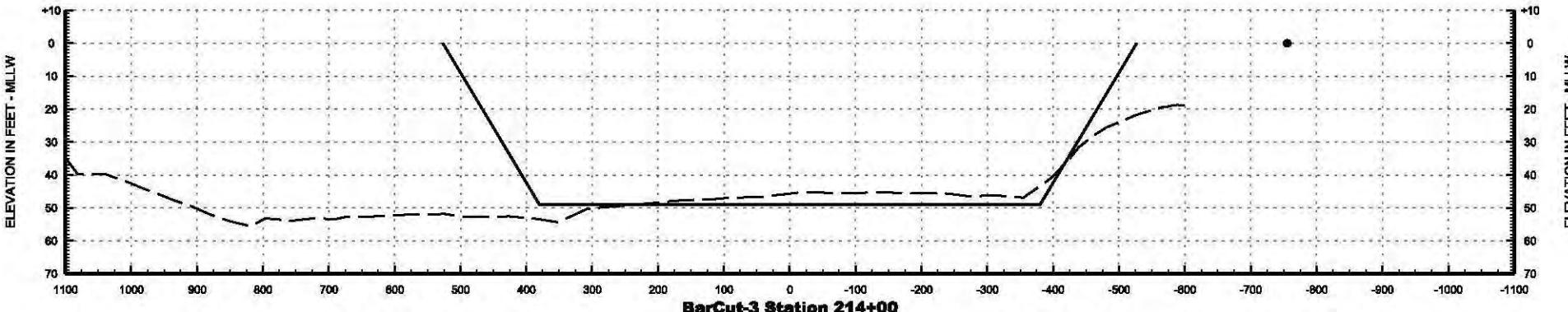
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\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

FIGURE  
**16**



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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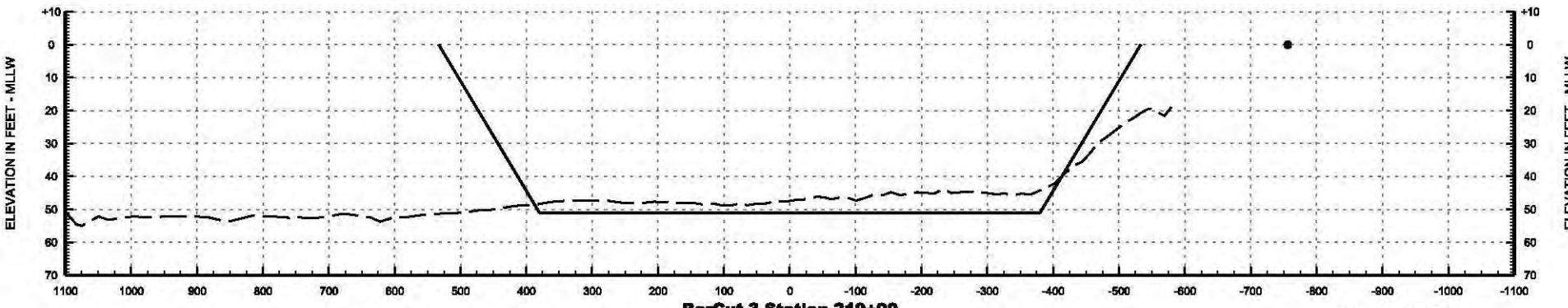
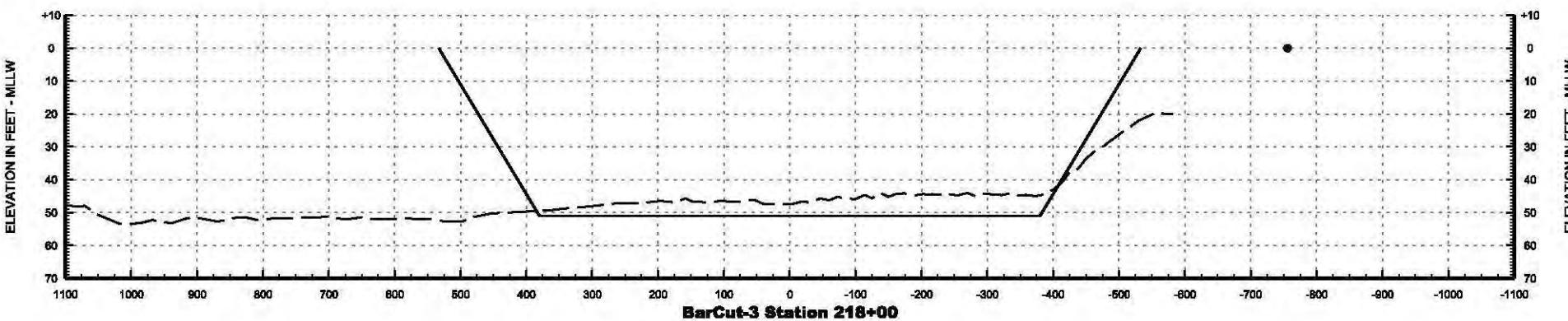
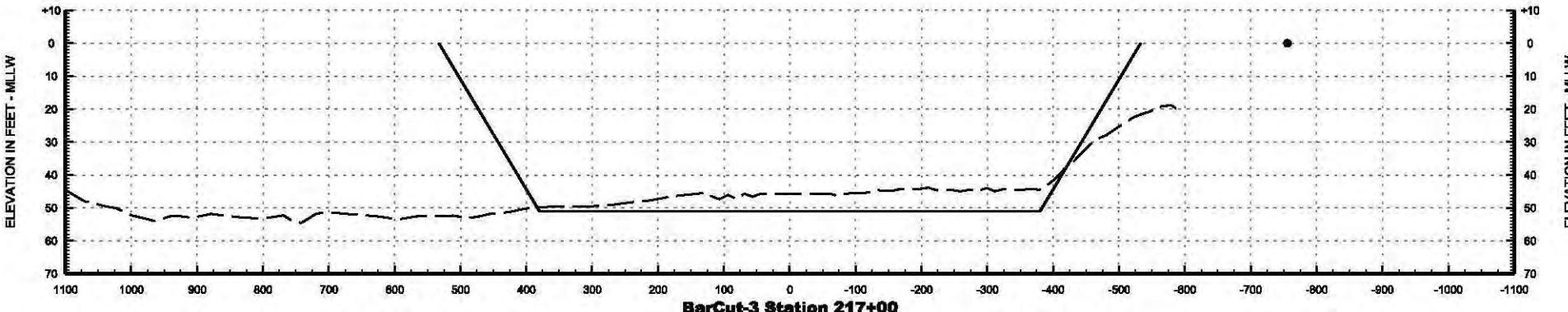
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\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

17

FIGURE



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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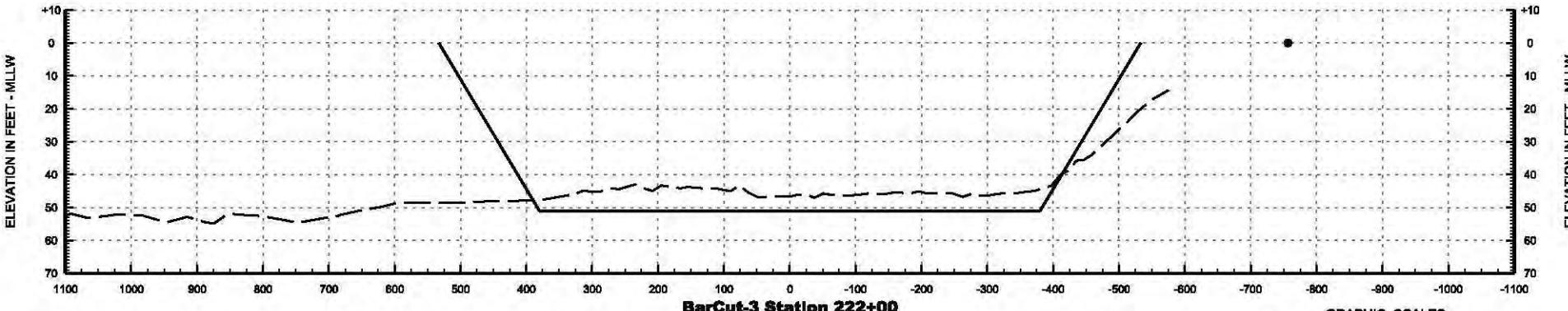
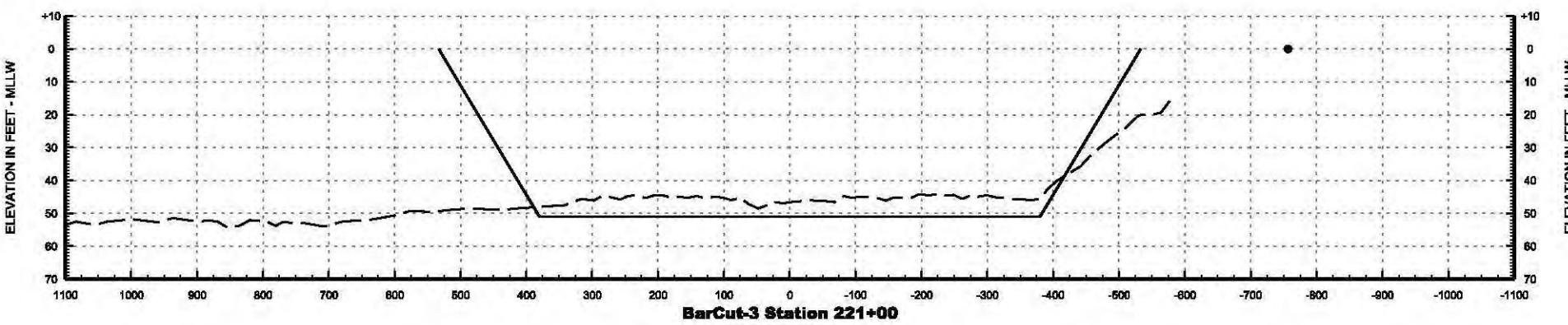
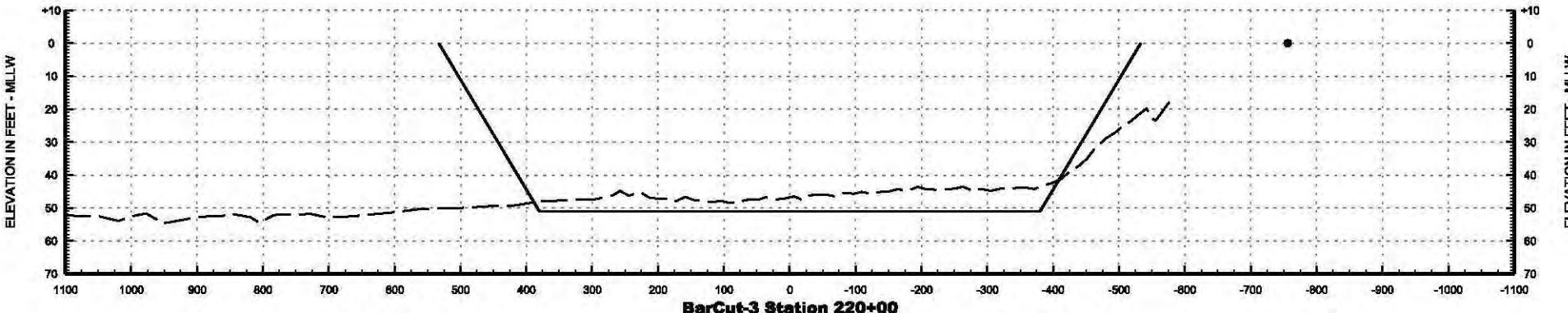
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\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

FIGURE  
18



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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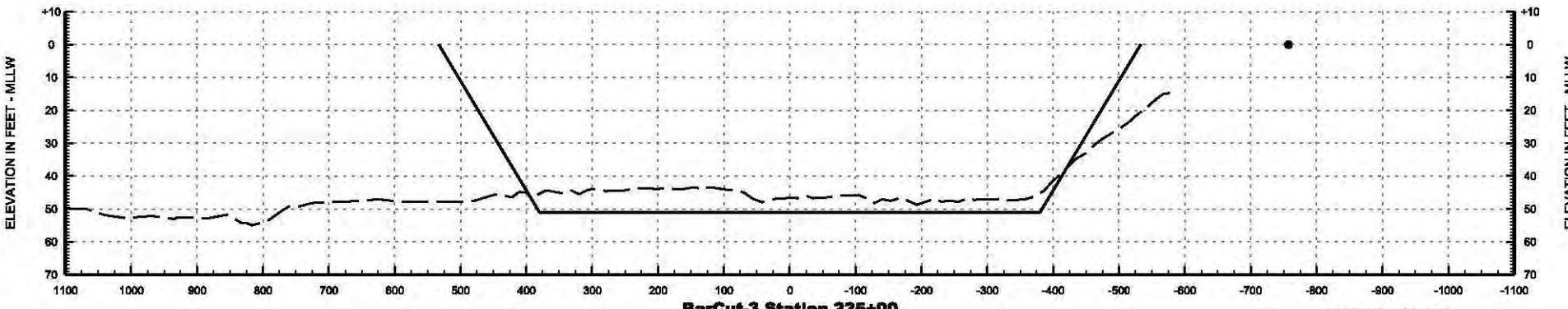
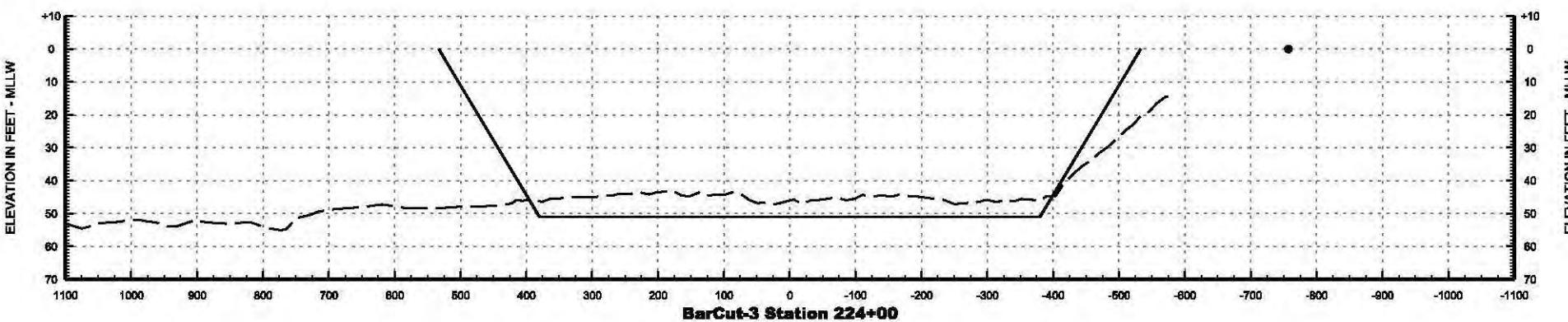
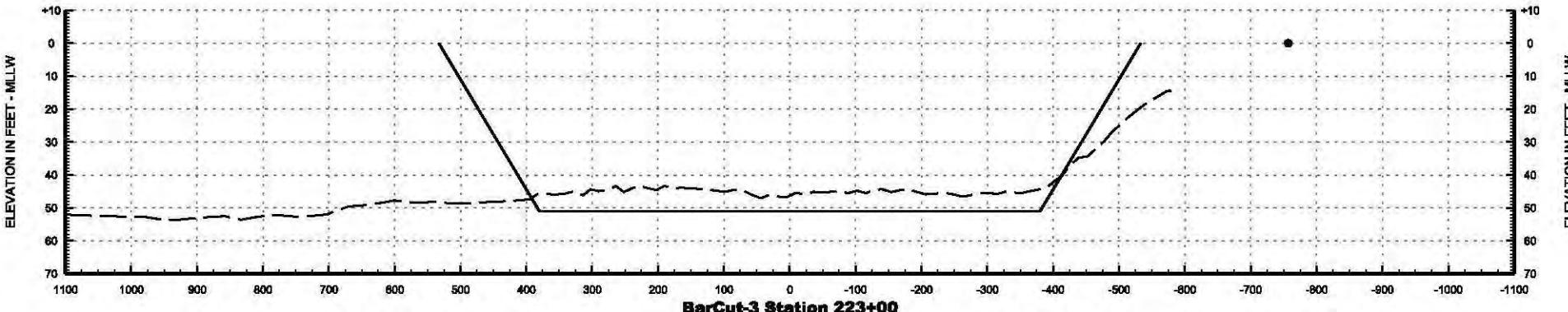
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\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

FIGURE  
**19**



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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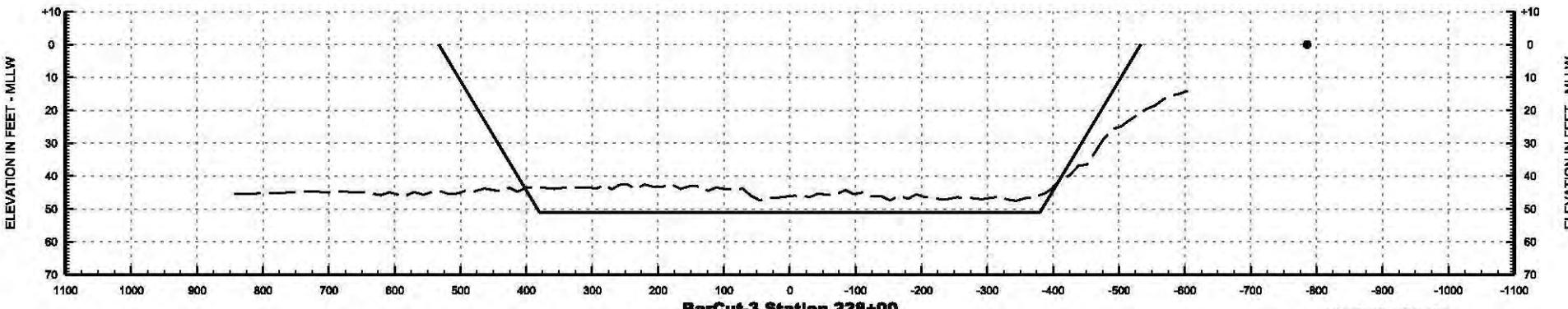
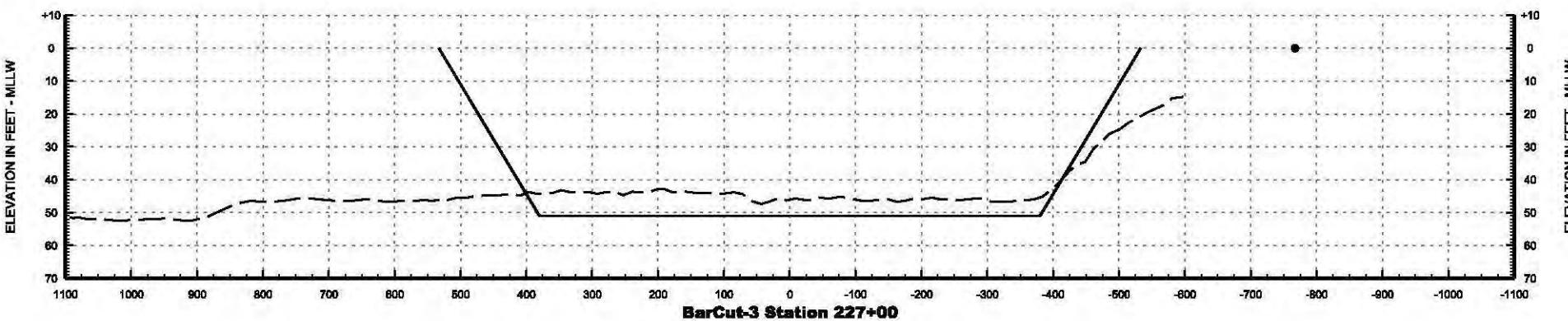
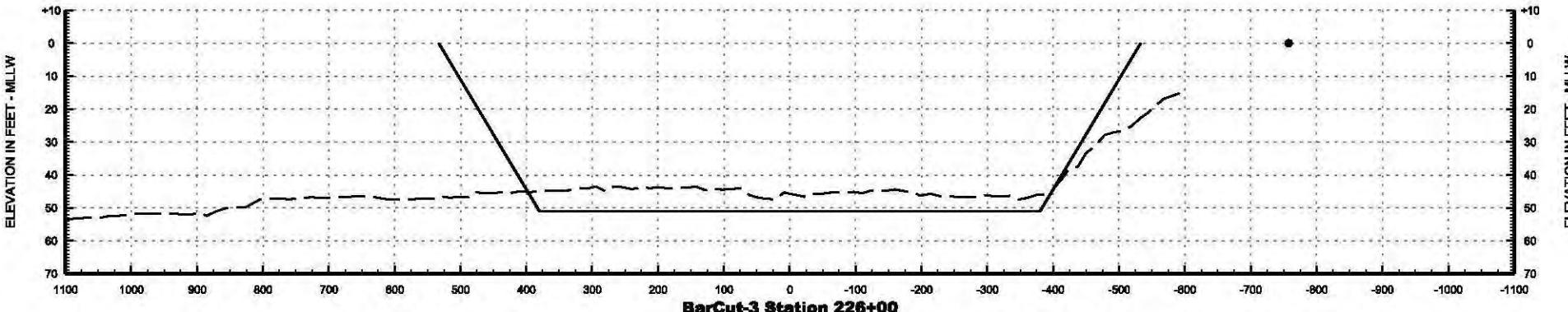
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● APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

FIGURE  
**20**



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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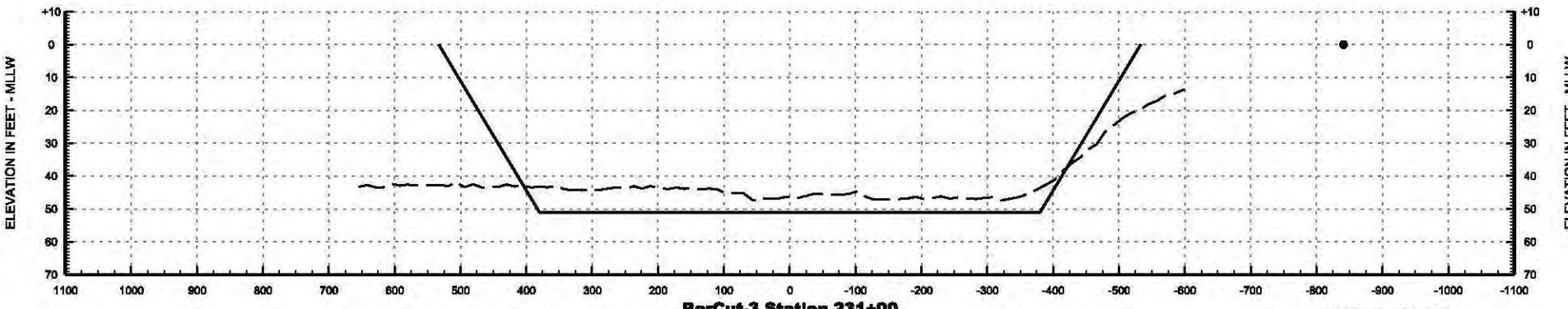
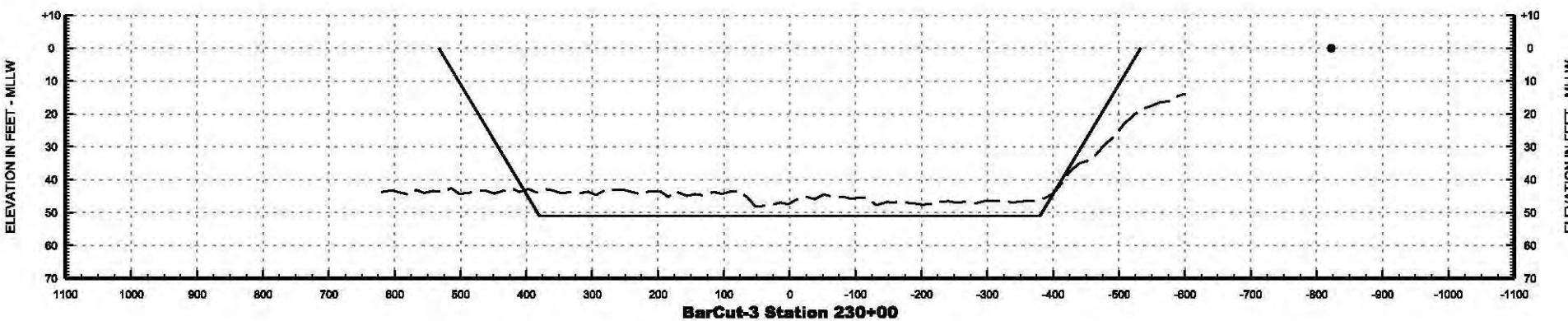
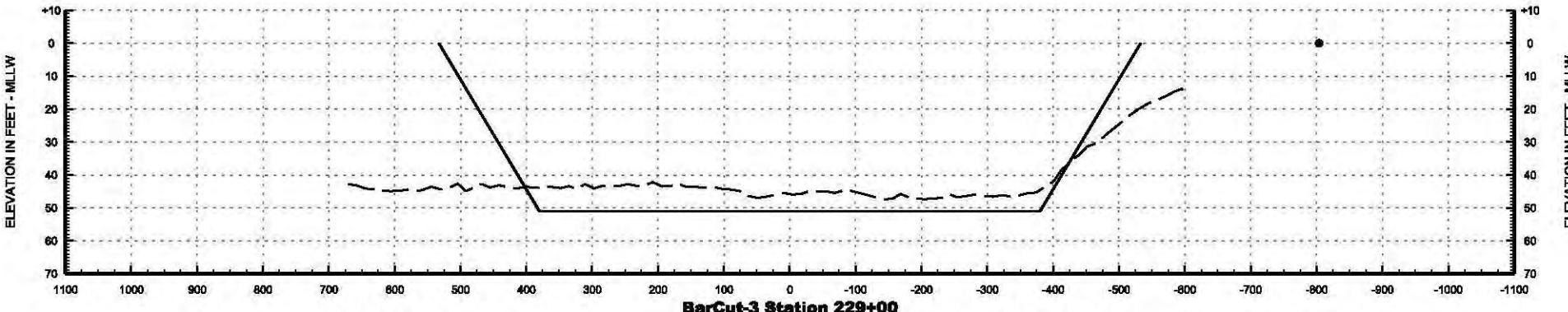
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\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

FIGURE  
**21**



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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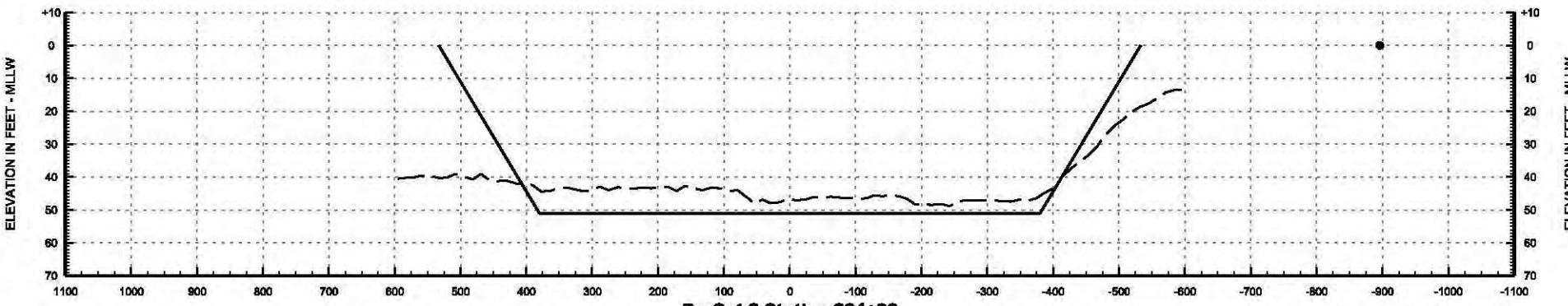
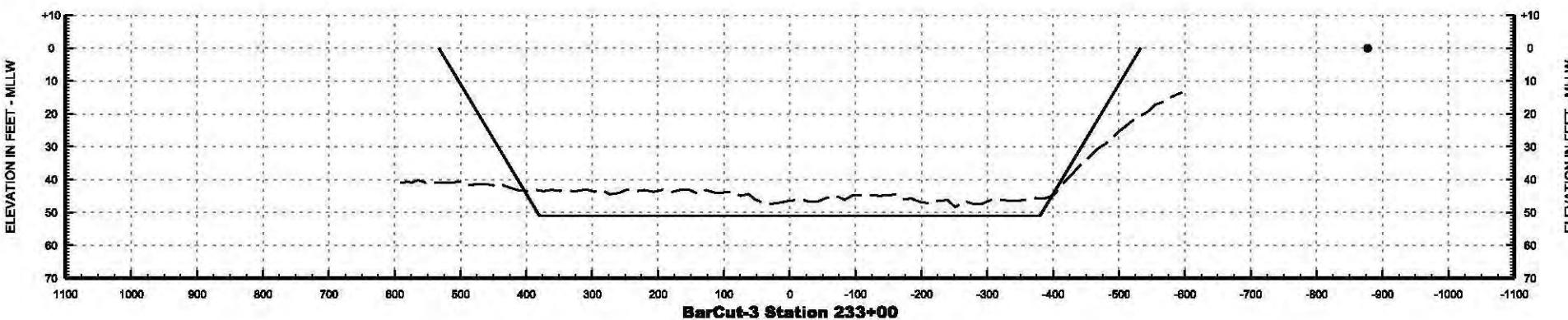
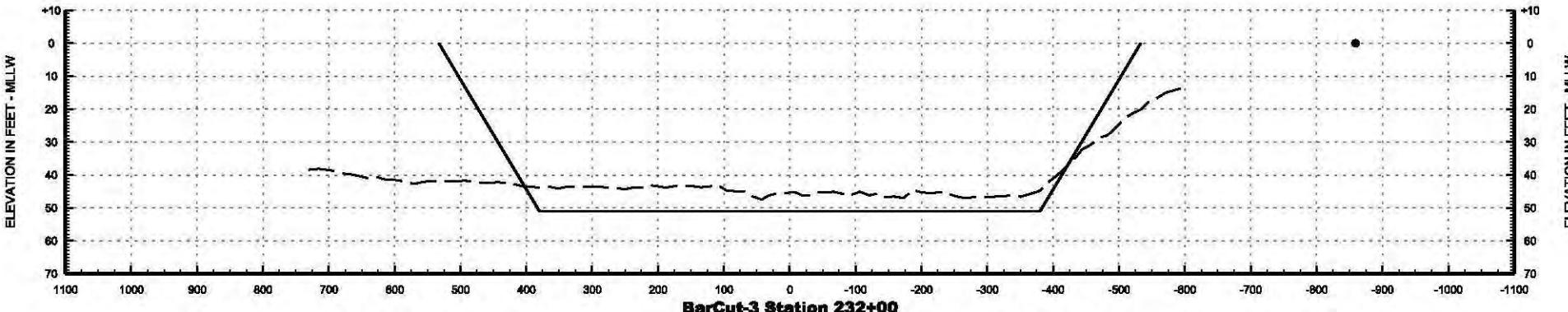
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\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

FIGURE  
**22**



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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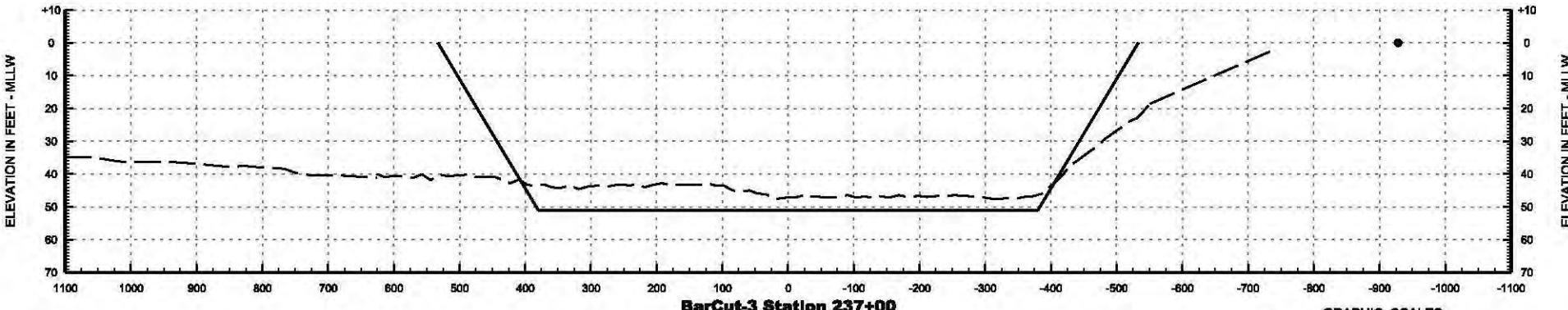
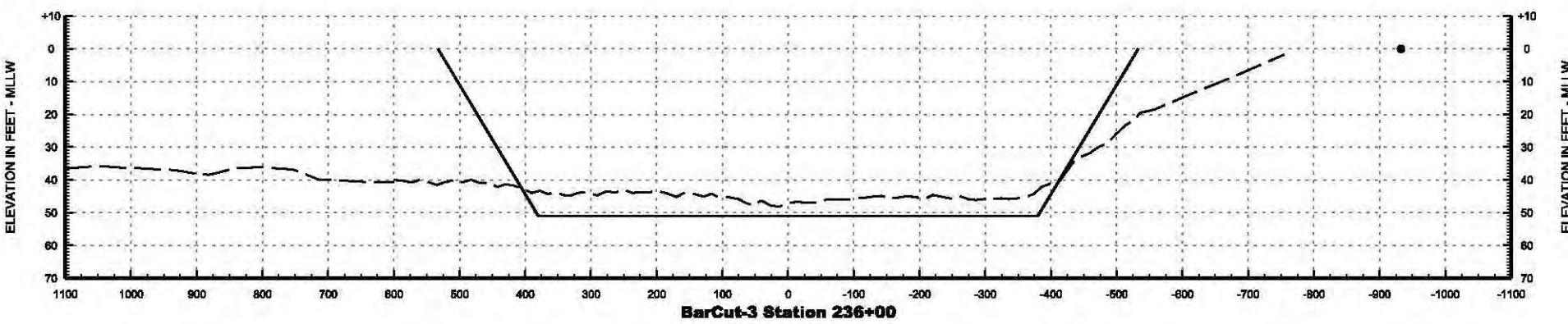
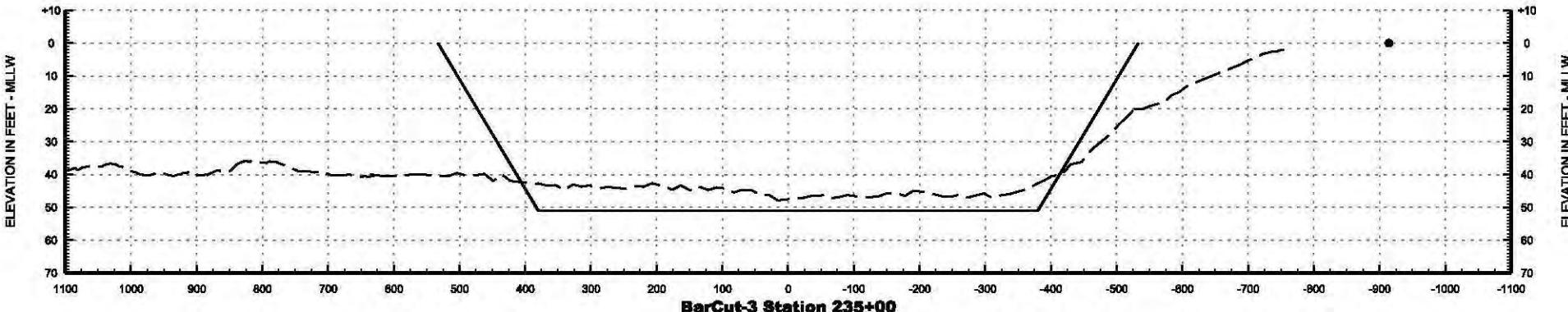
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\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

FIGURE  
**23**



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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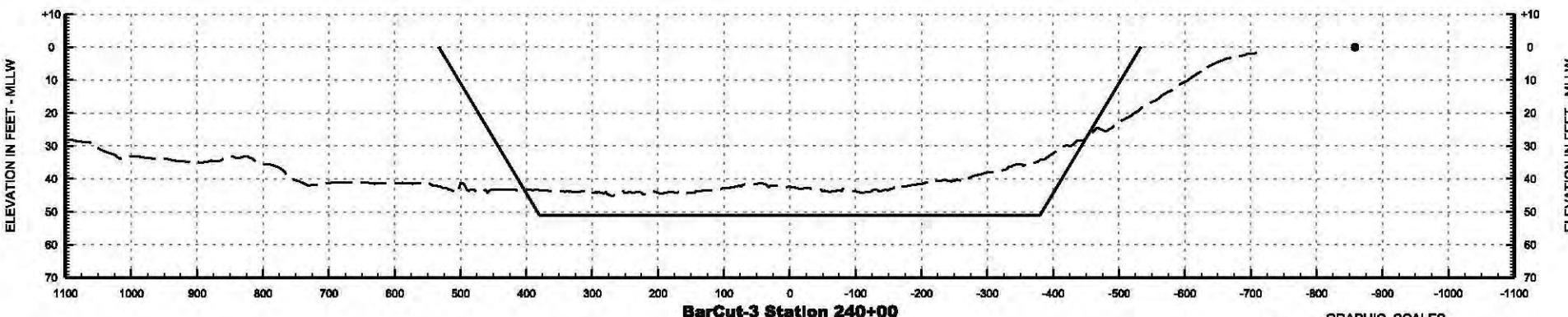
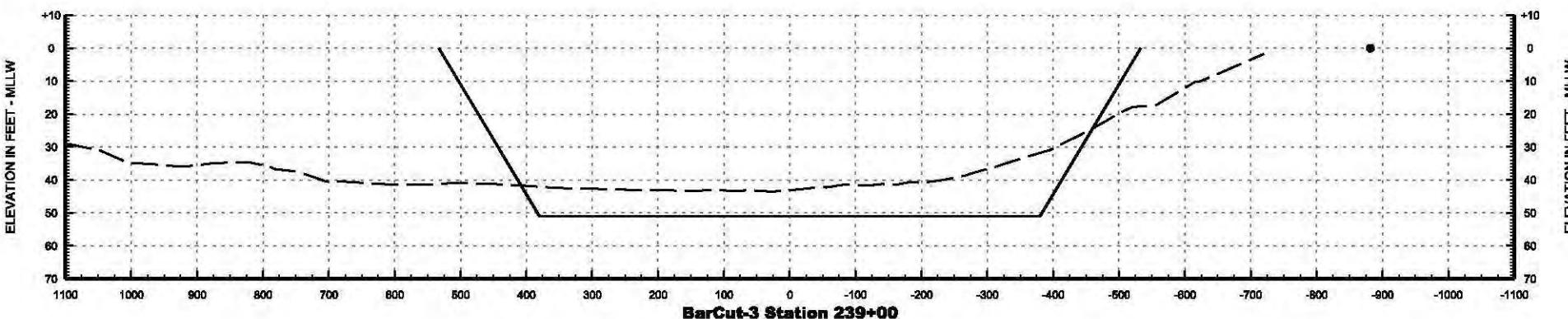
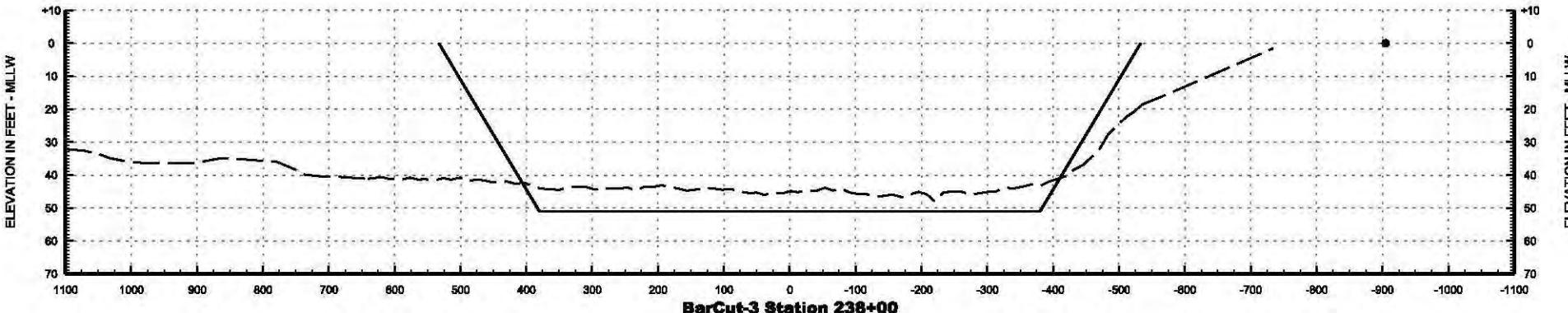
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— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

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FIGURE



GRAPHIC SCALES	
HORIZONTAL	120' 0 120' 240'
VERTICAL	24' 0 24' 48'



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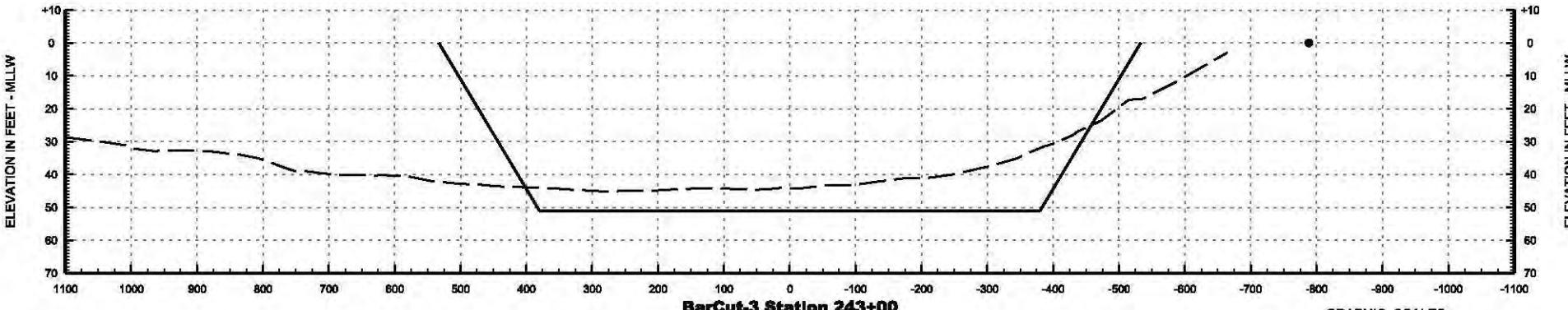
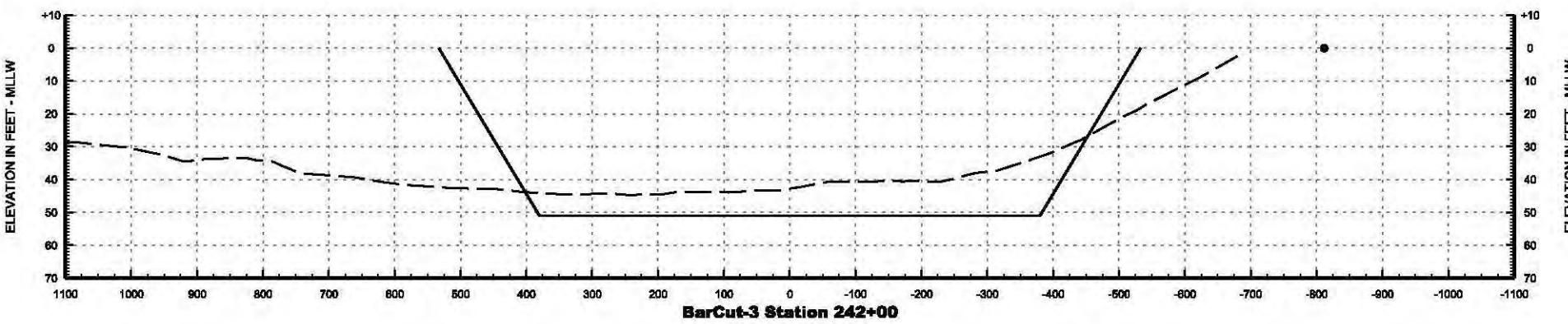
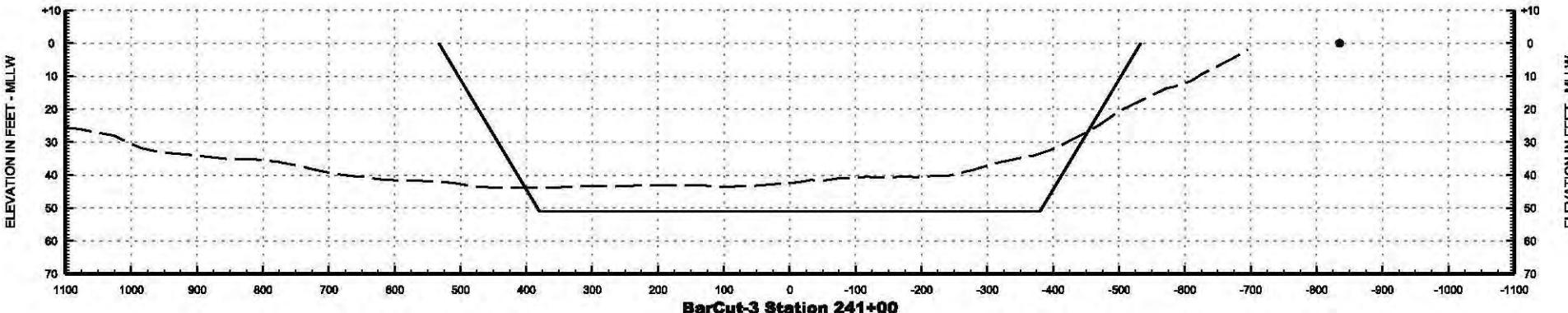
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JACKSONVILLE HARBOR NAVIGATION PROJECT  
DUVAL COUNTY, FLORIDA  
DREDGING CROSS SECTIONS  
BARCUT-3 STATION 238+00 TO 240+00  
GENERAL REEVALUATION REPORT II - ENGINEERING APPENDIX

\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

**25**

**FIGURE**



GRAPHIC SCALES	
HORIZONTAL	120' 0 120' 240'
VERTICAL	24' 0 24' 48'



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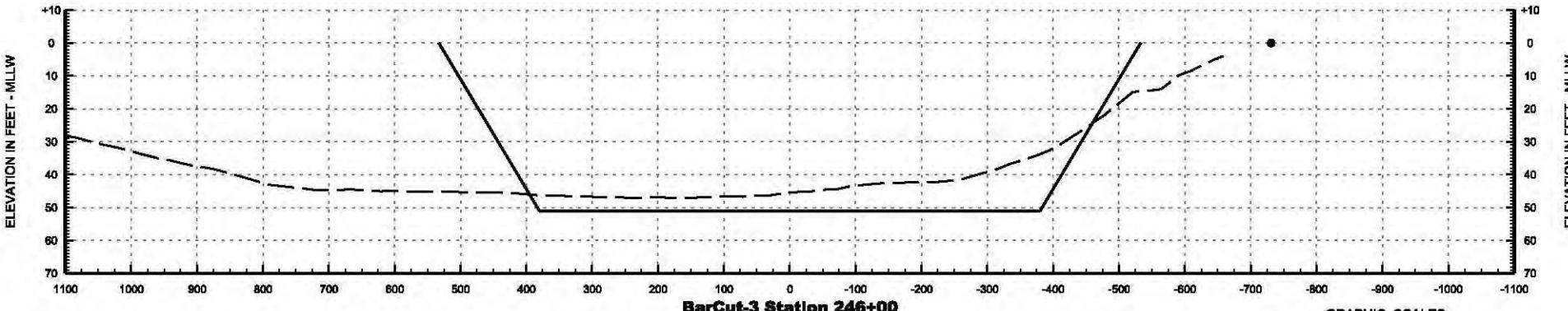
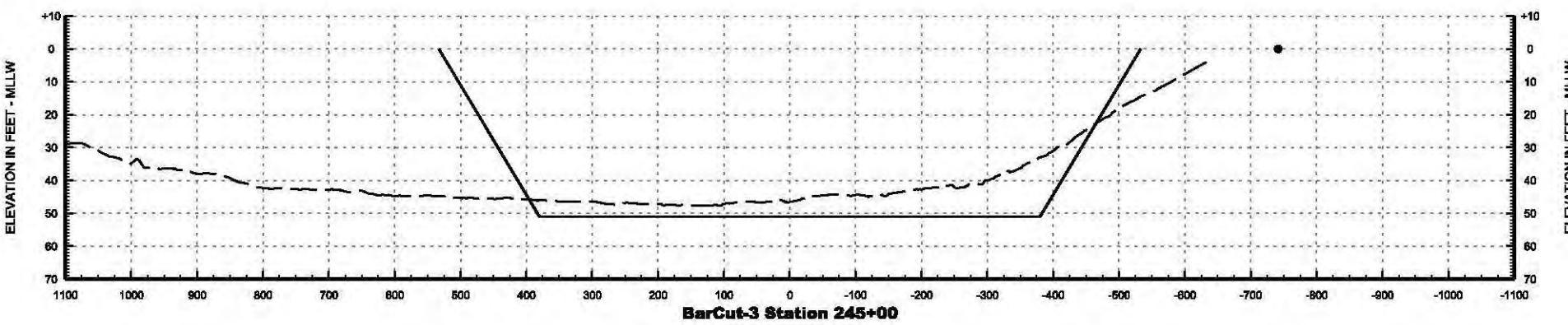
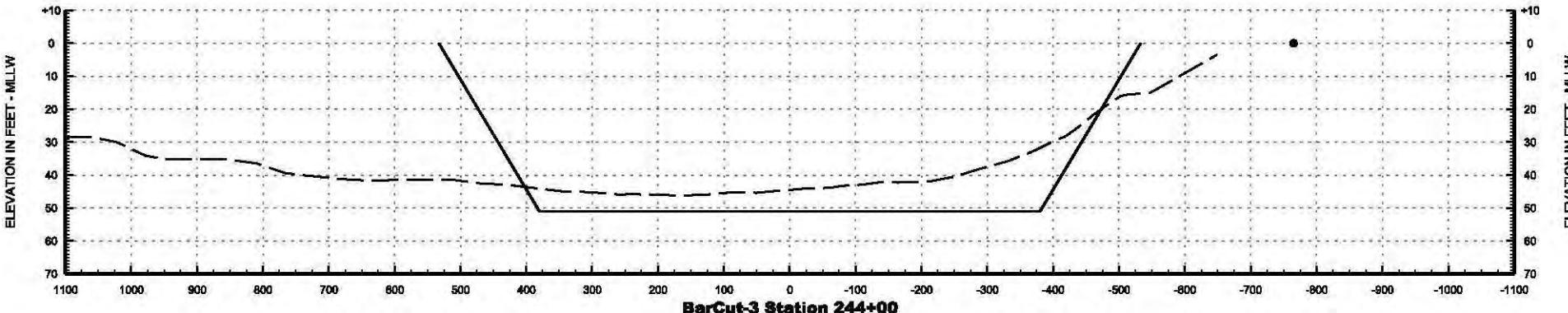
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\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

FIGURE  
**26**



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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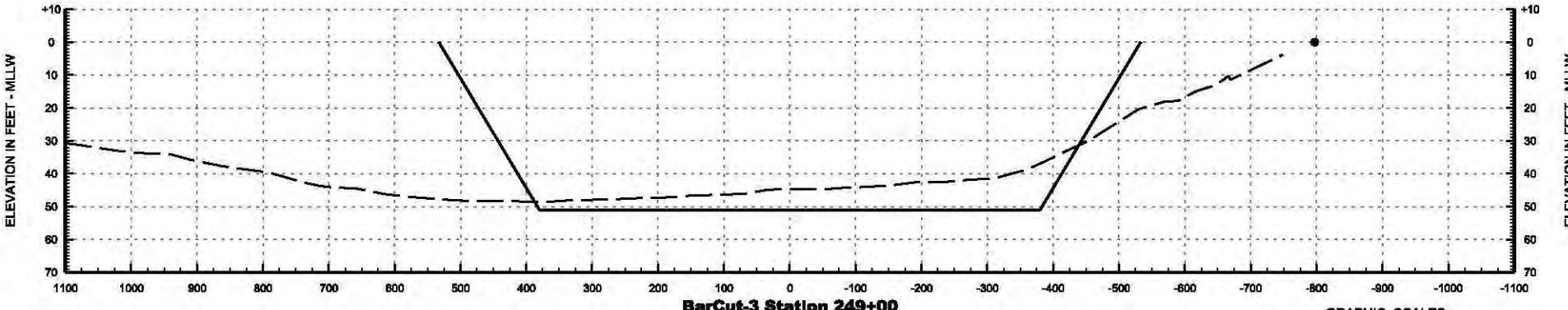
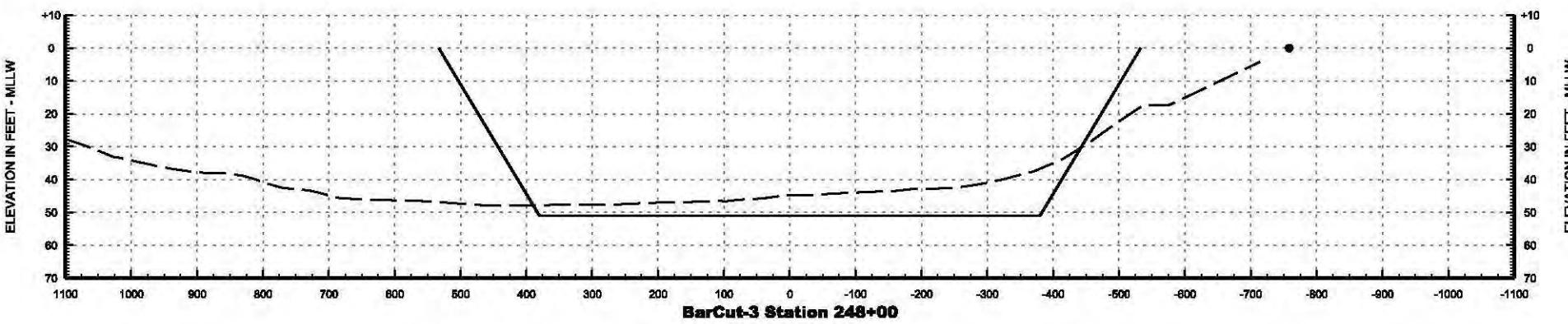
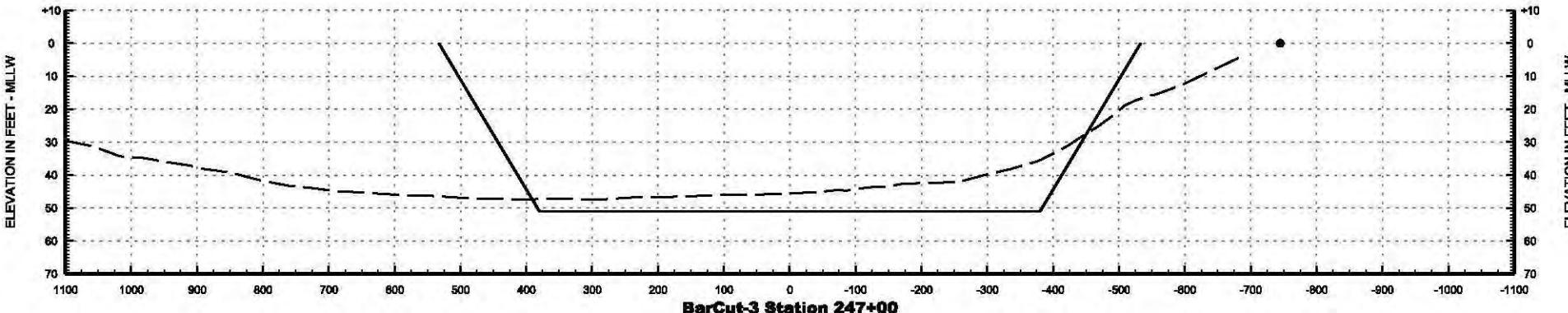
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— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

FIGURE  
27



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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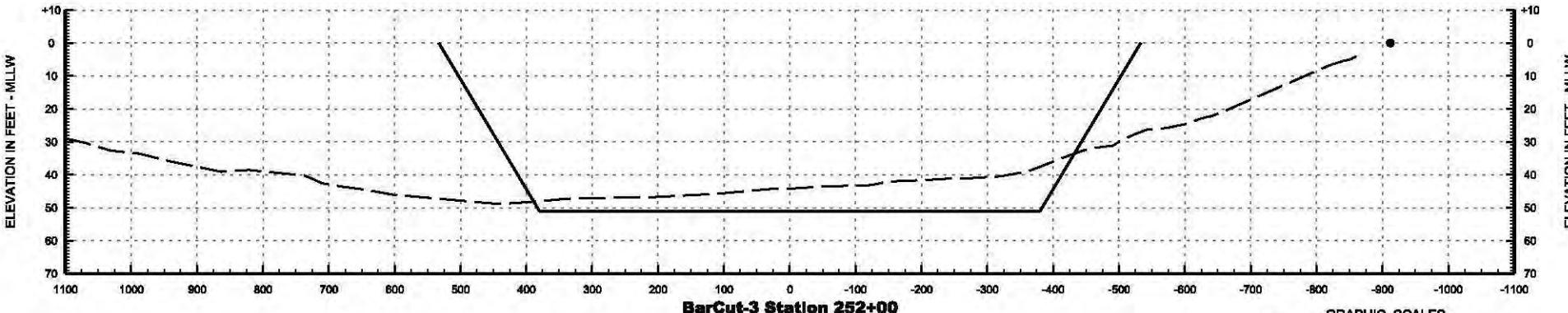
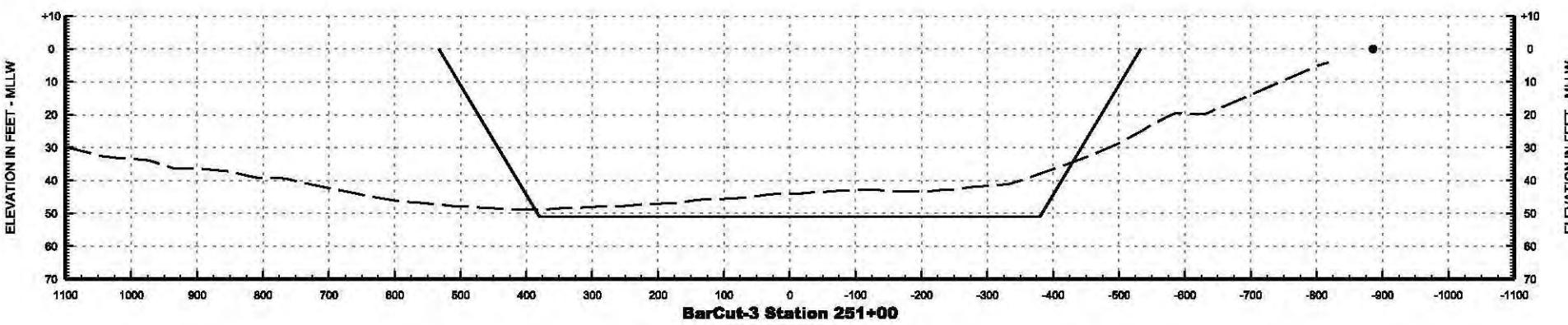
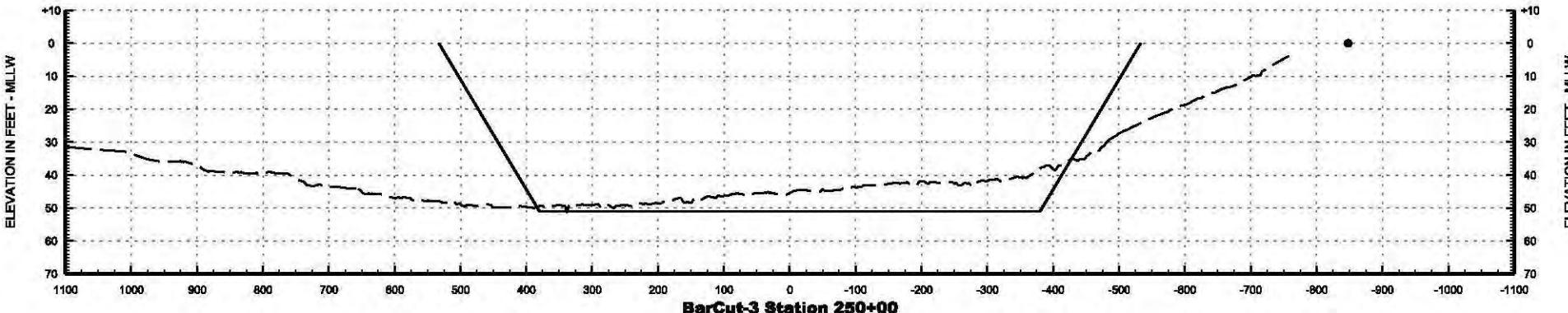
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\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

FIGURE  
**28**



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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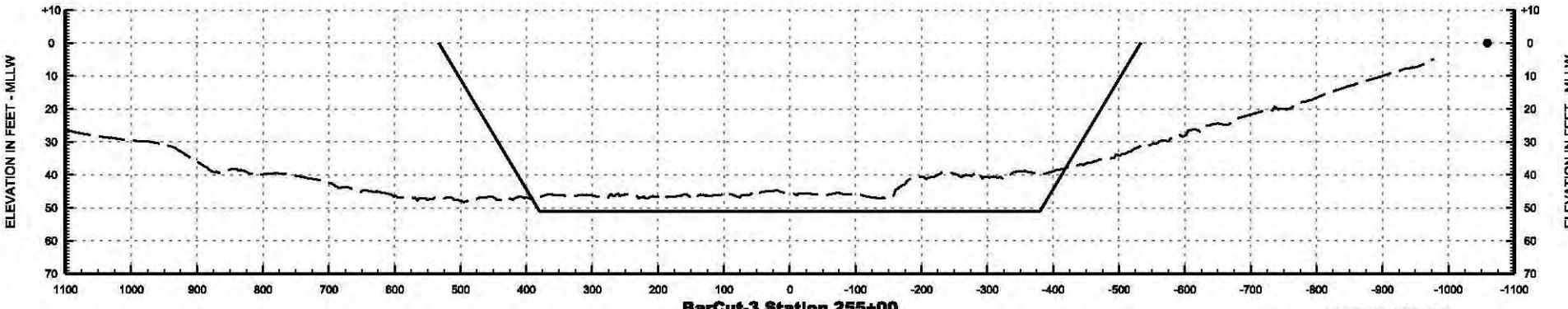
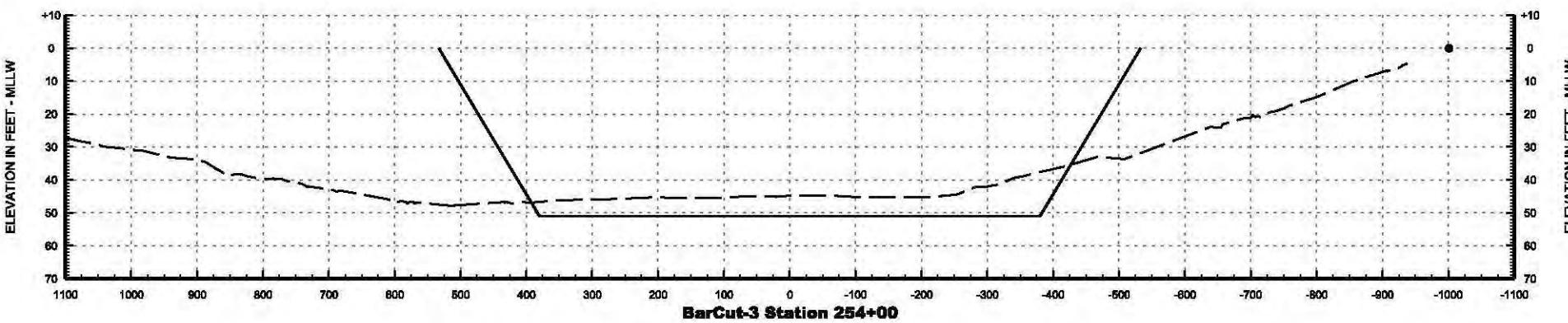
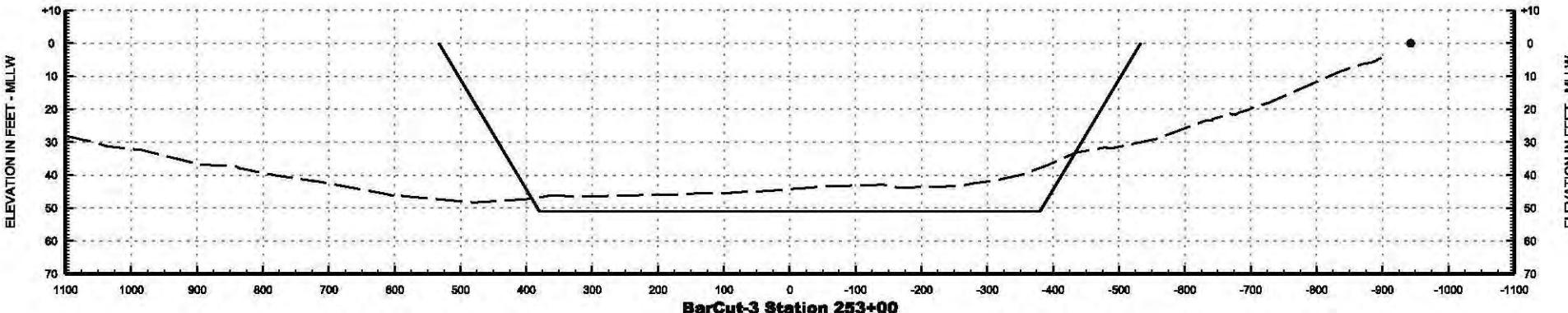
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\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

FIGURE  
**29**



GRAPHIC SCALES	
HORIZONTAL	120' 0 120' 240'
VERTICAL	24' 0 24' 48'



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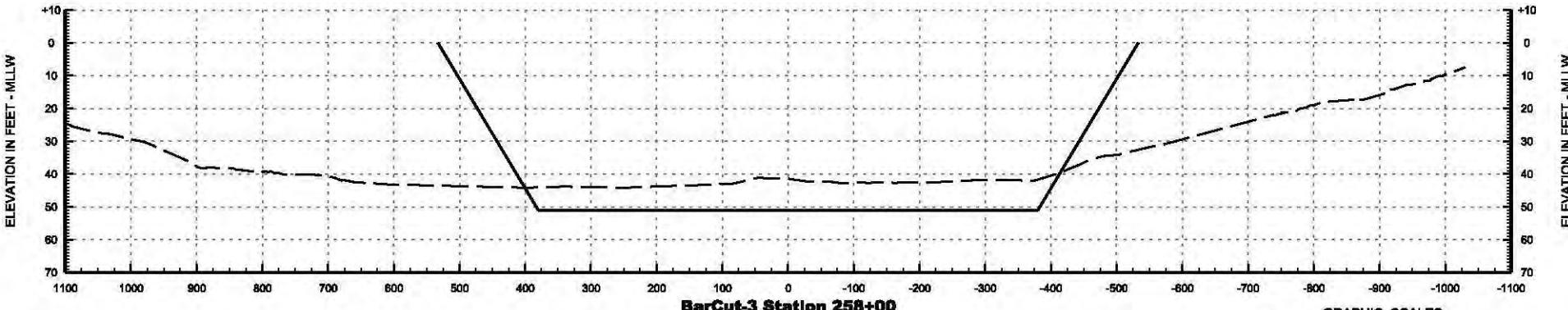
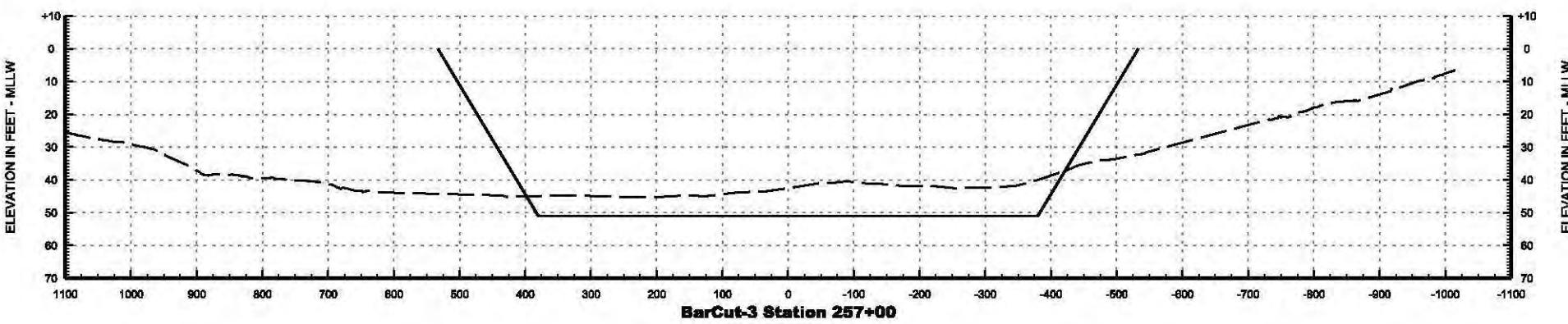
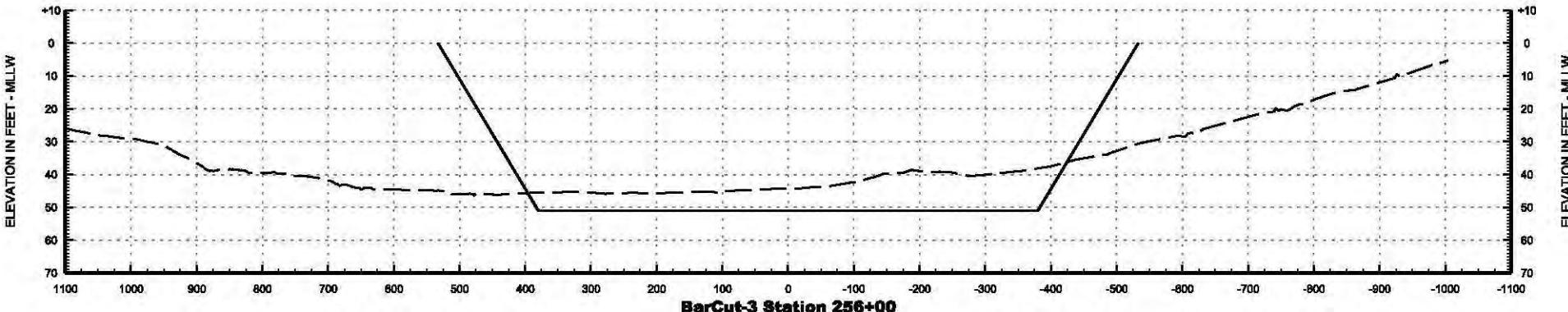
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BARCUT-3 STATION 253+00 TO 255+00  
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\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

FIGURE  
**30**



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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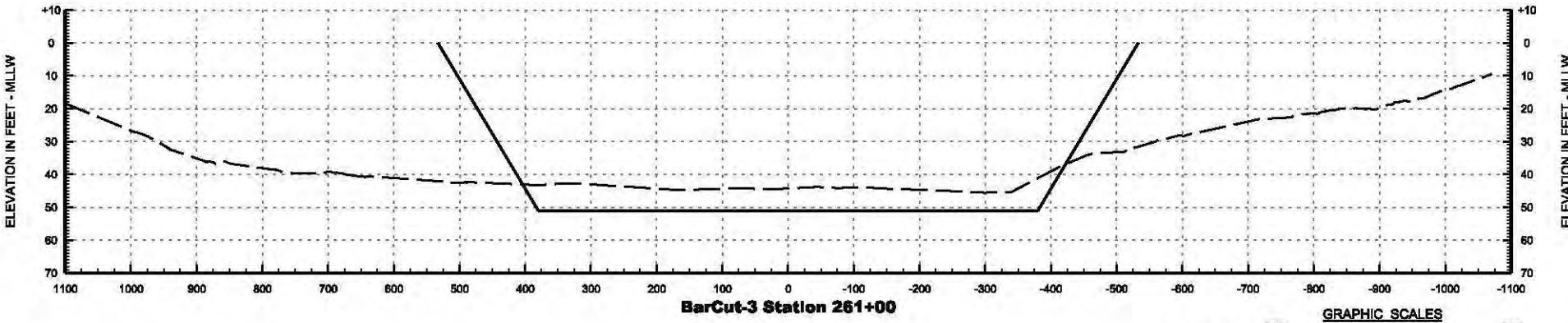
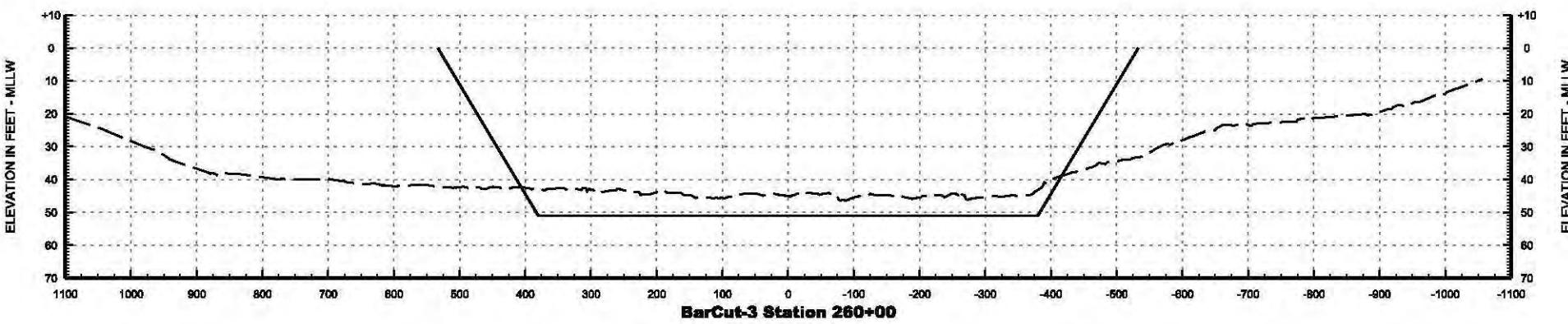
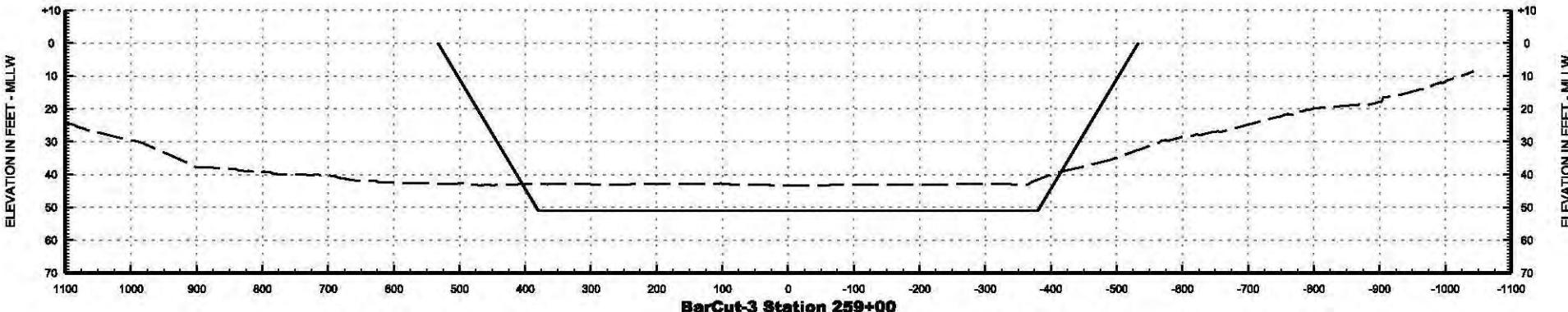
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\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

FIGURE  
31



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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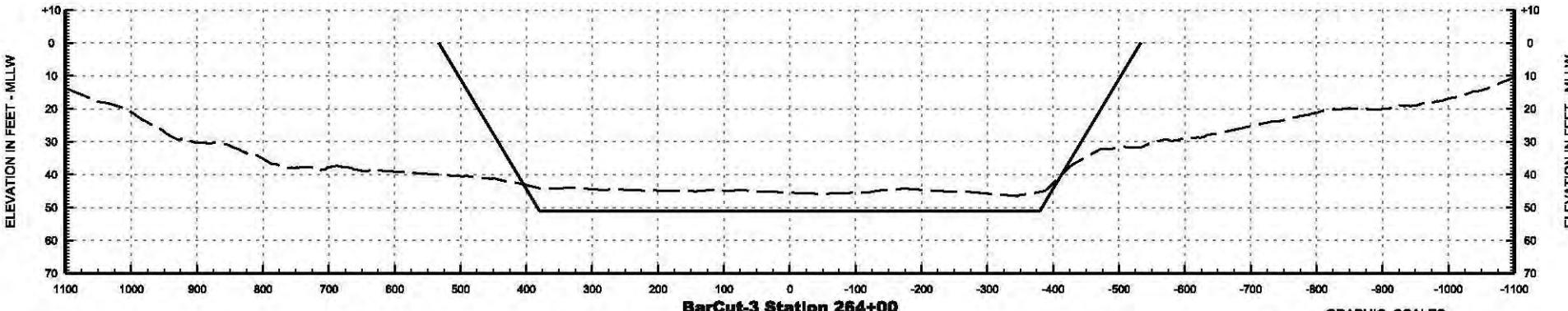
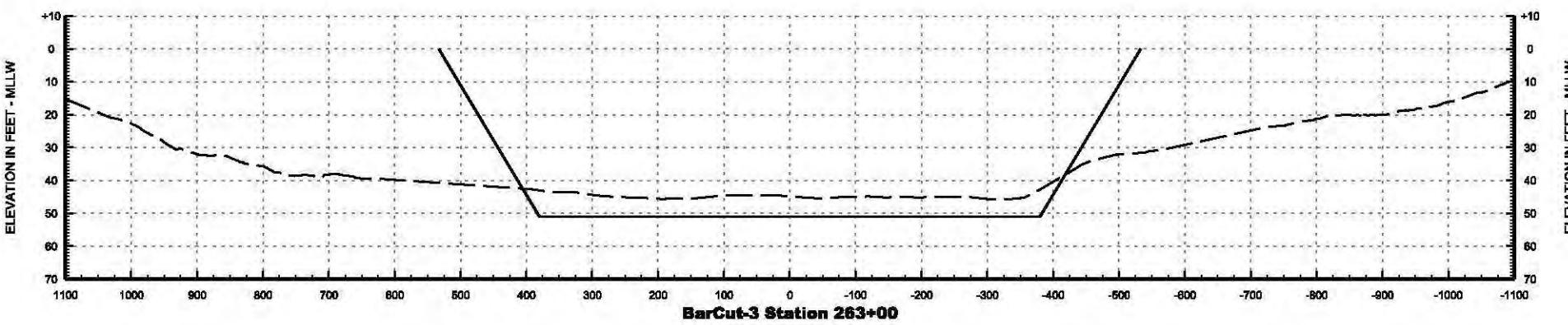
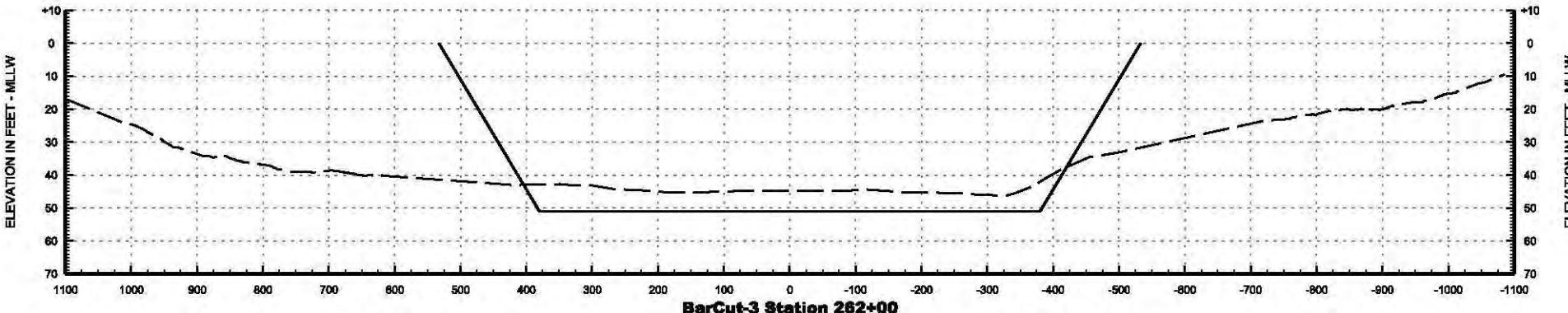
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\* APPROXIMATE SHORELINE  
— Existing Ground  
— Dredge Template  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

FIGURE  
**32**



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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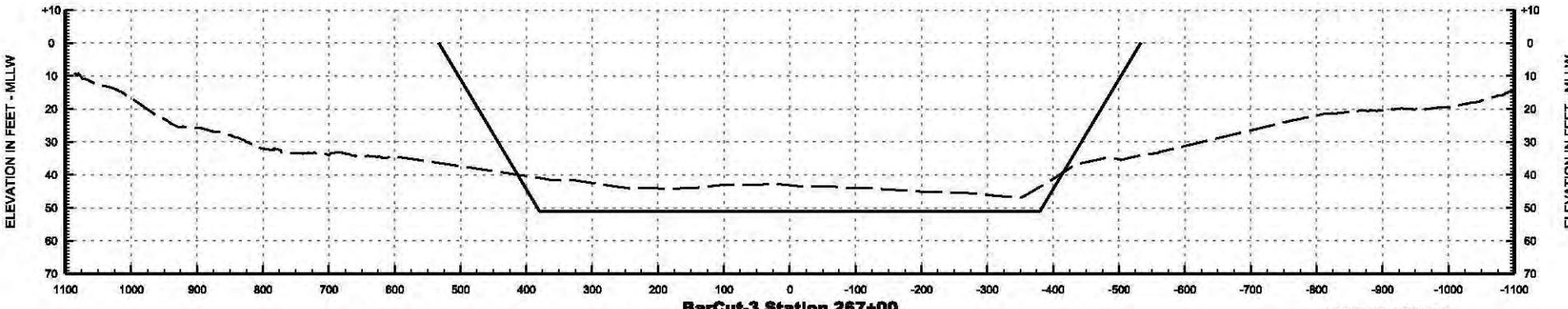
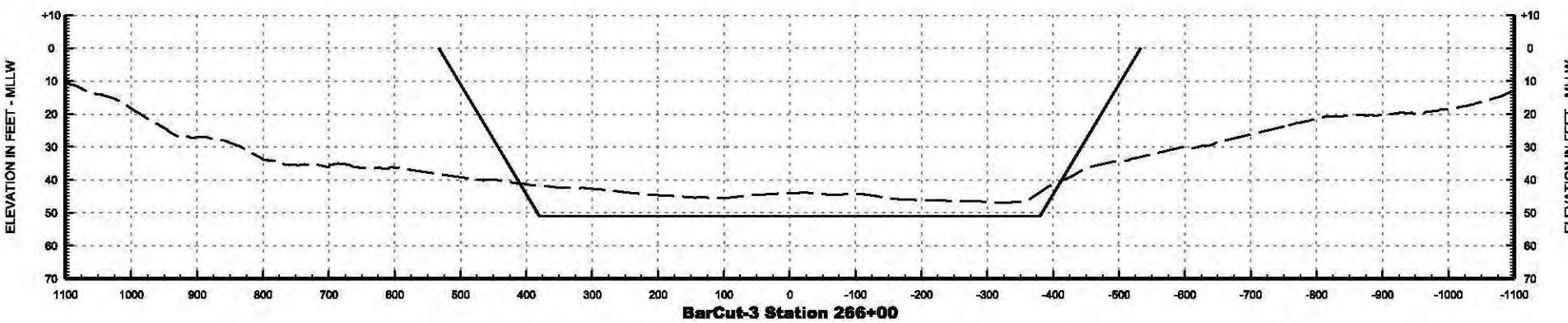
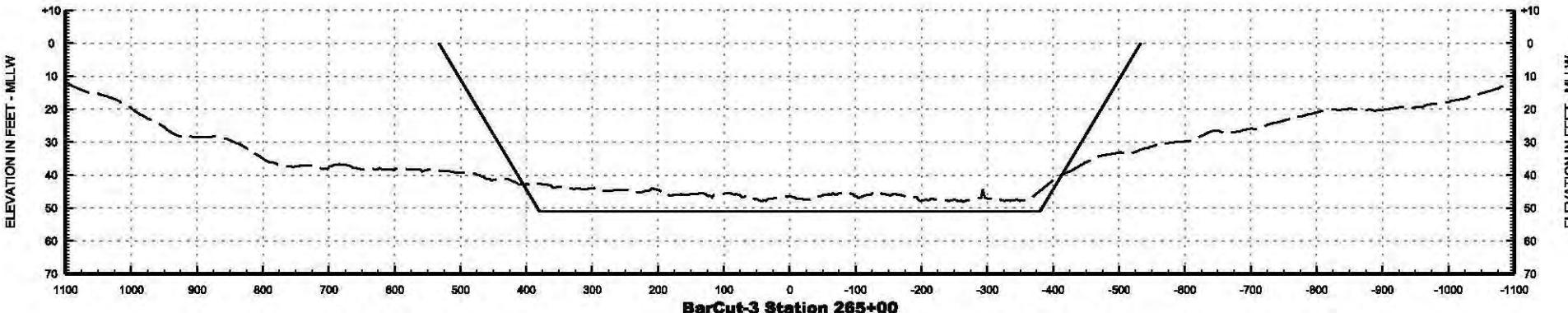
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— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

FIGURE  
33



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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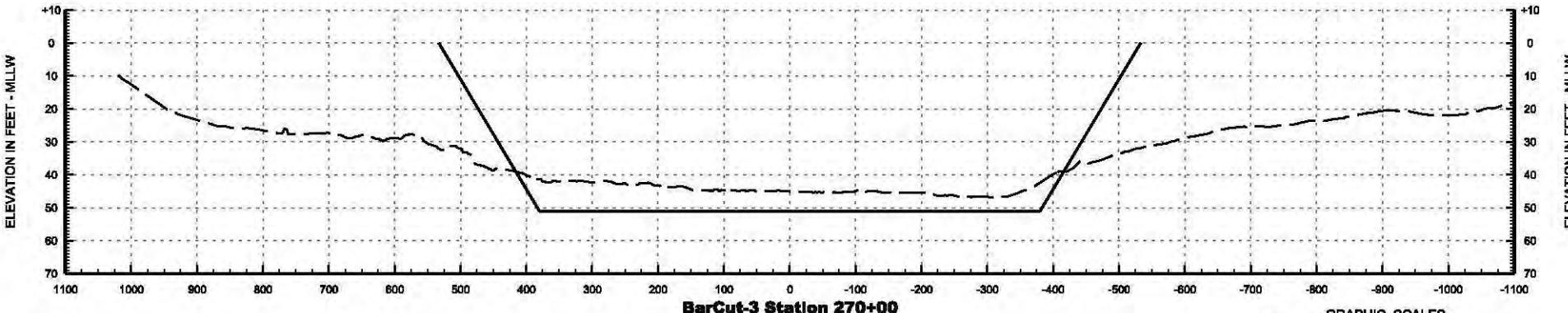
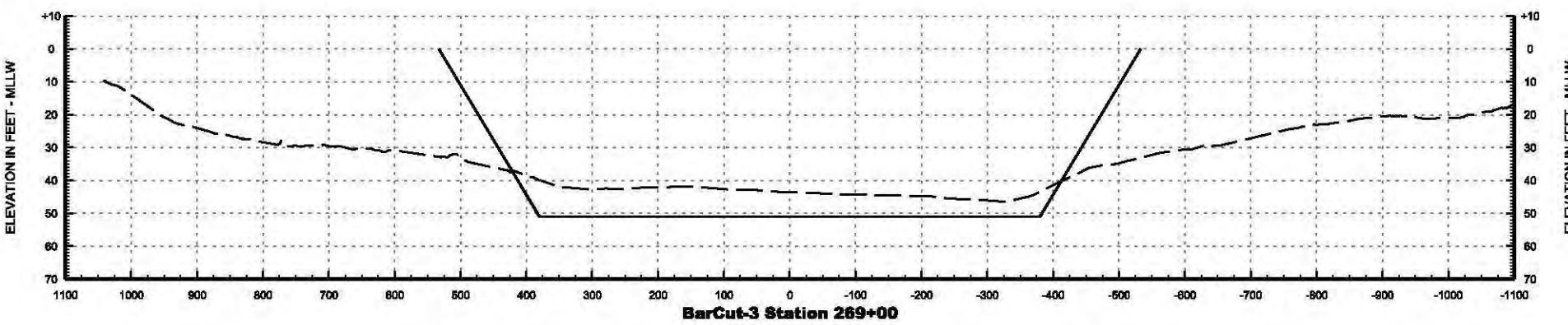
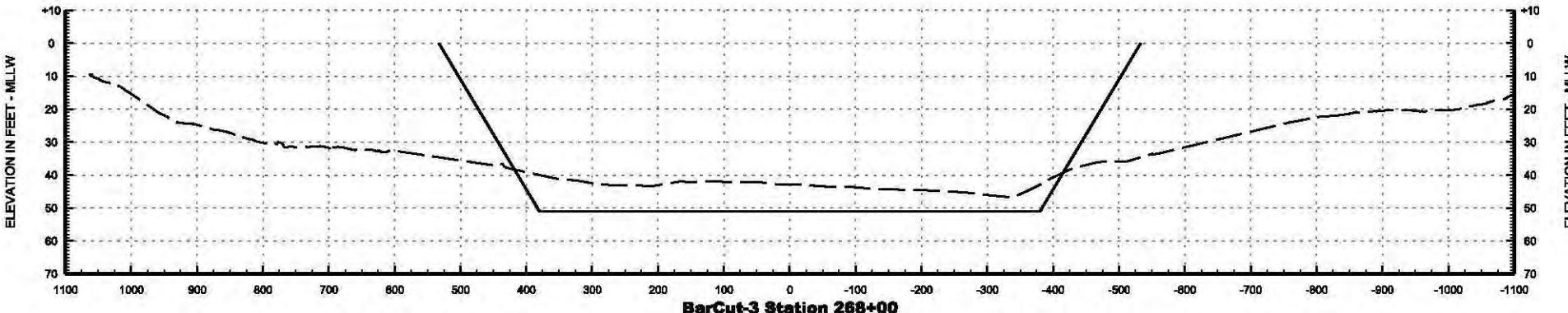
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\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

FIGURE  
34



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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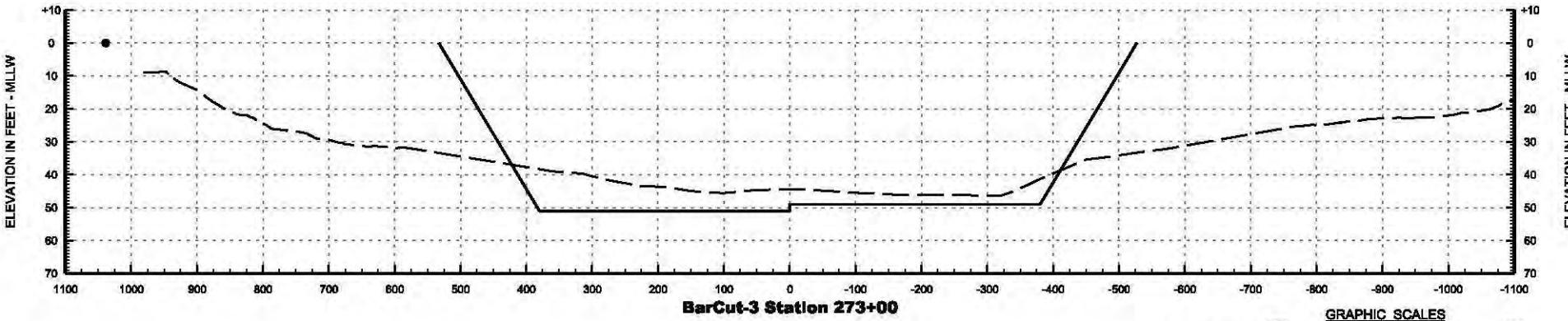
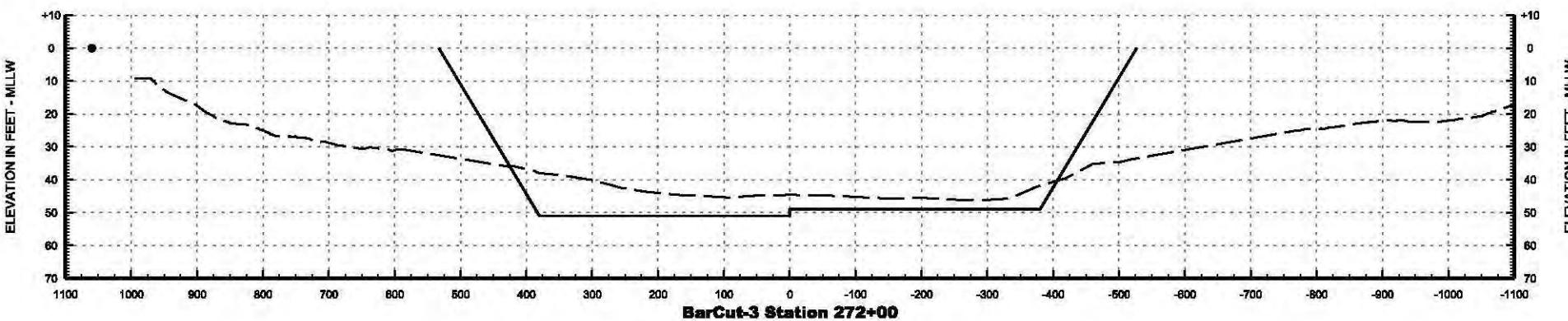
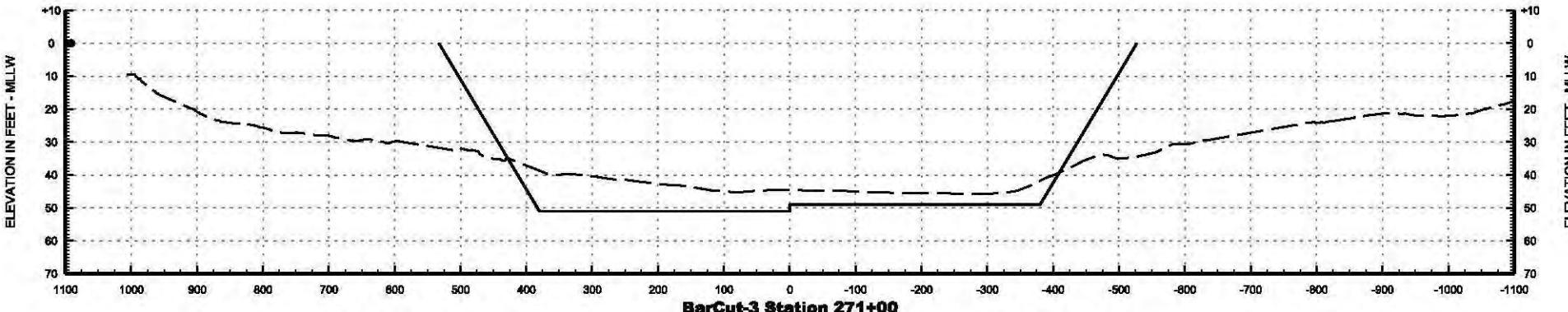
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— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

FIGURE  
**35**



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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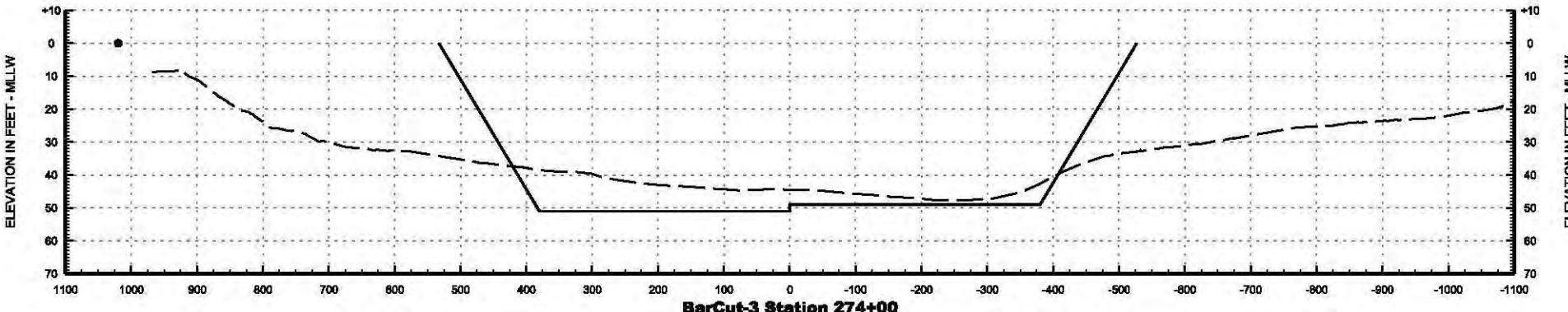
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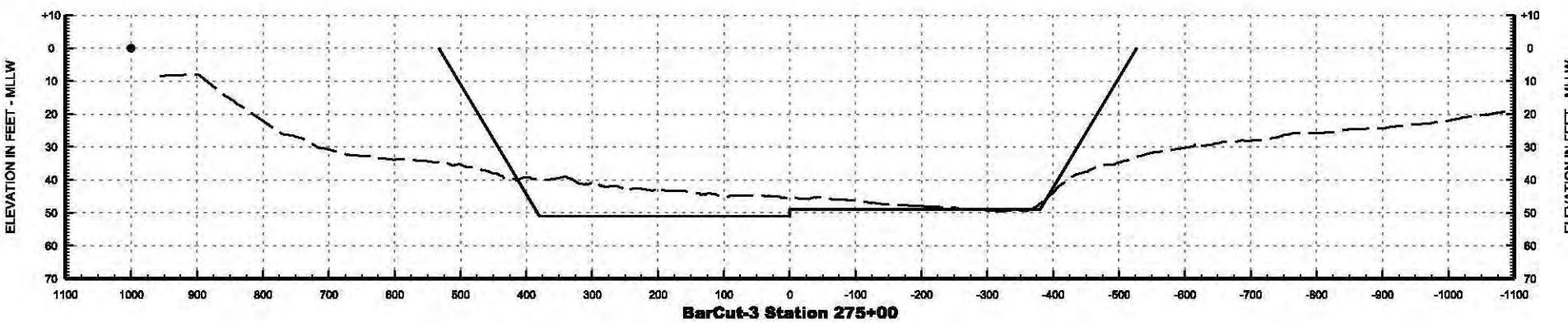
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— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

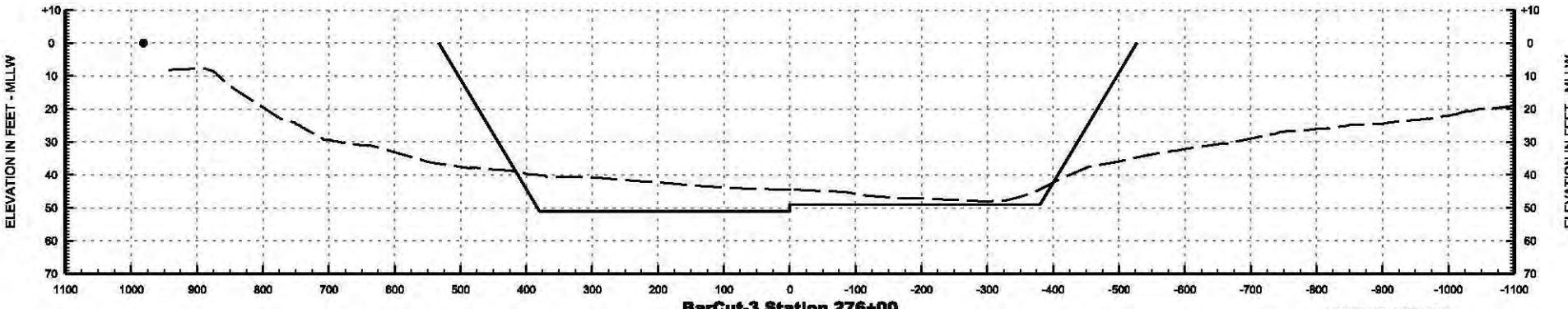
FIGURE  
36



BarCut-3 Station 274+00



BarCut-3 Station 275+00



BarCut-3 Station 276+00

#### GRAPHIC SCALES

HORIZONTAL	120'	0	120'	240'
VERTICAL	24'	0	24'	48'

• APPROXIMATE SHORELINE  
 — EXISTING GROUND  
 — DREDGE TEMPLATE  
 NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.



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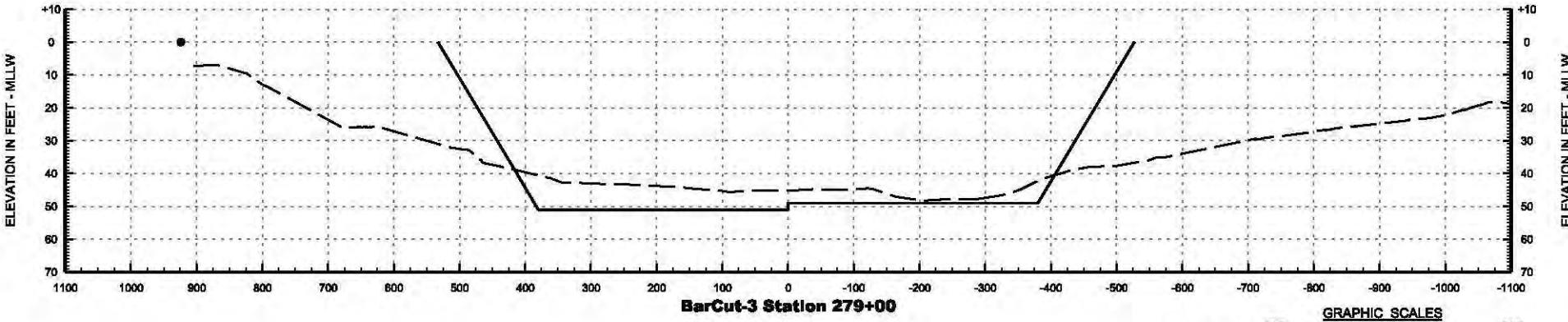
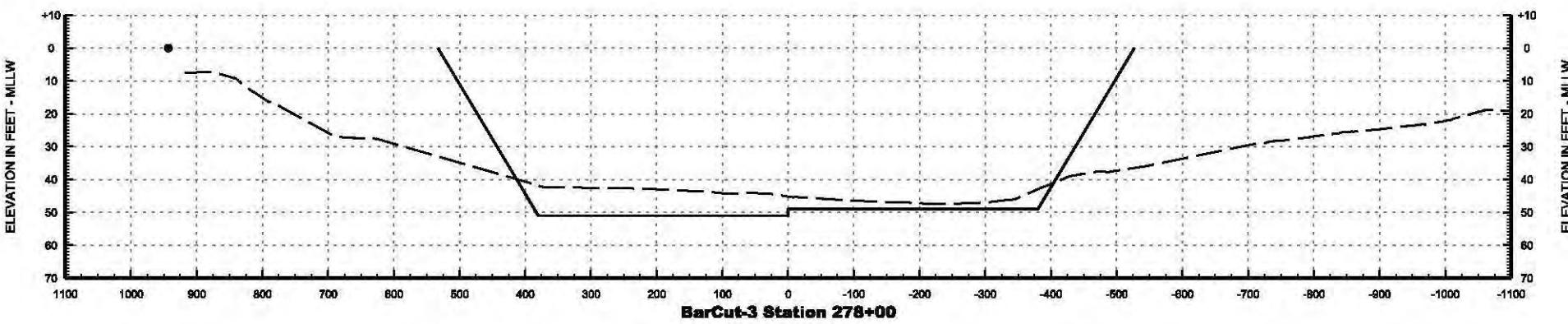
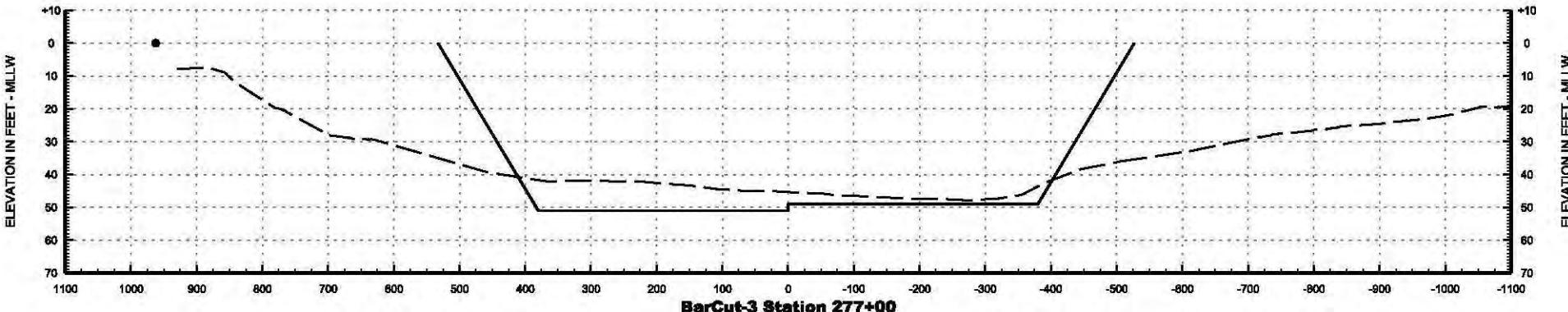
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37

FIGURE



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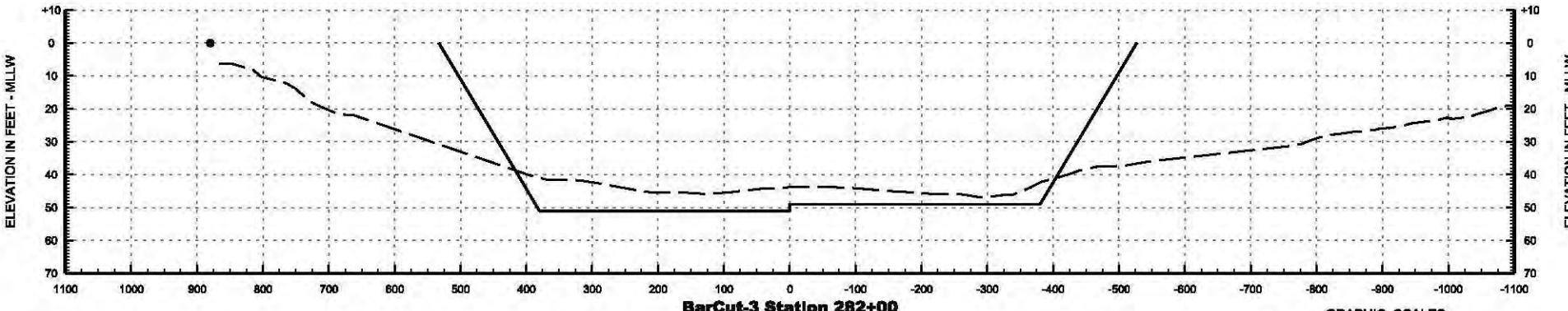
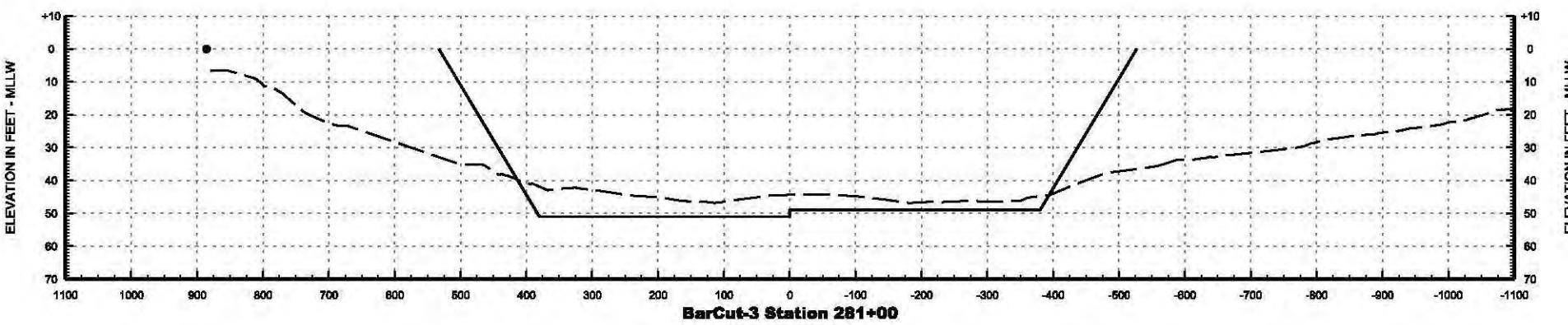
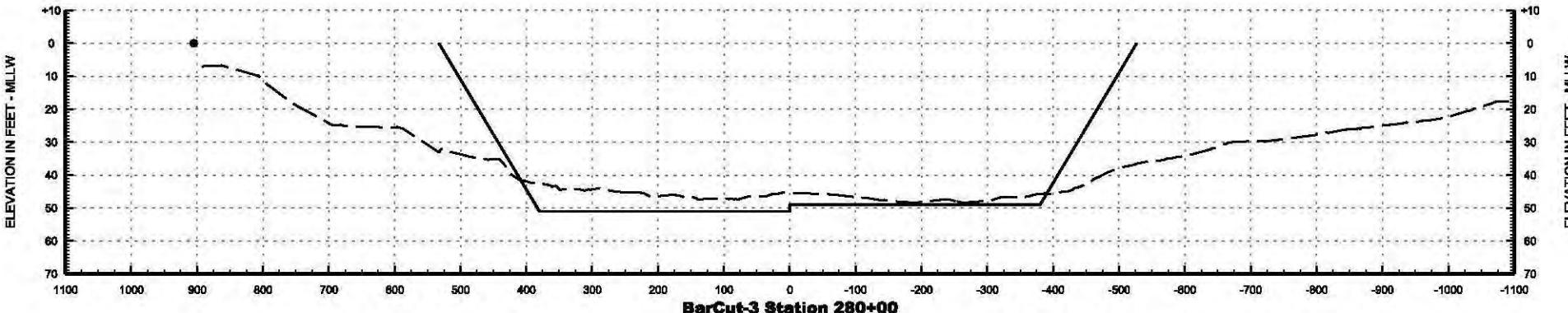
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— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

FIGURE  
**38**



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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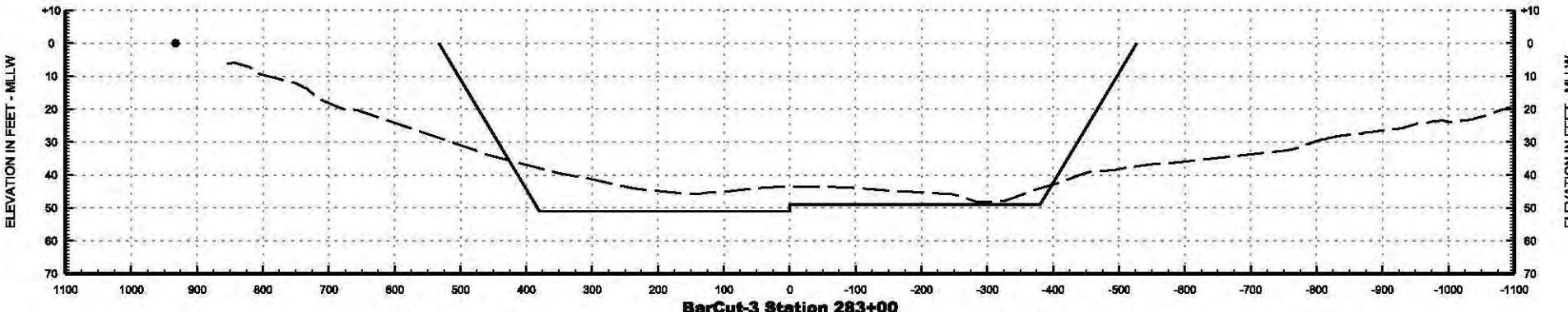
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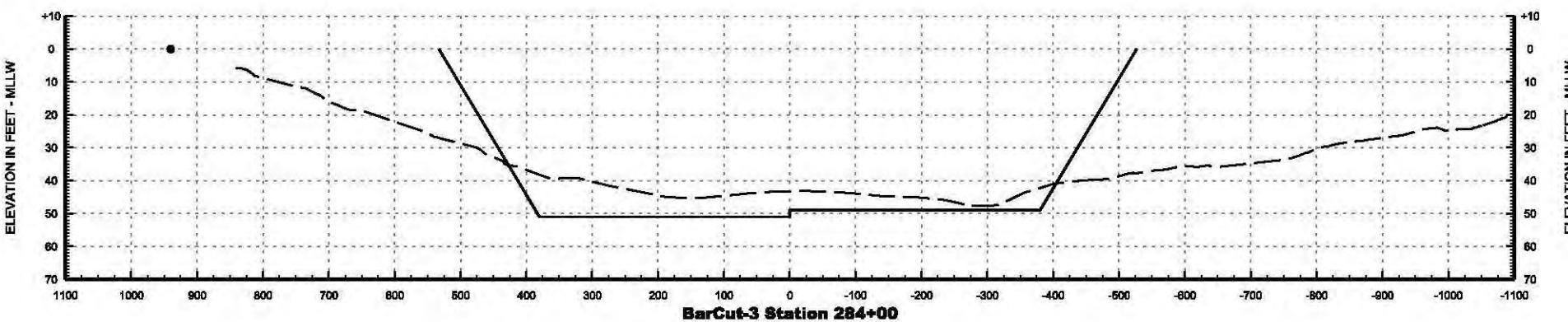
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\* APPROXIMATE SHORELINE  
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— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

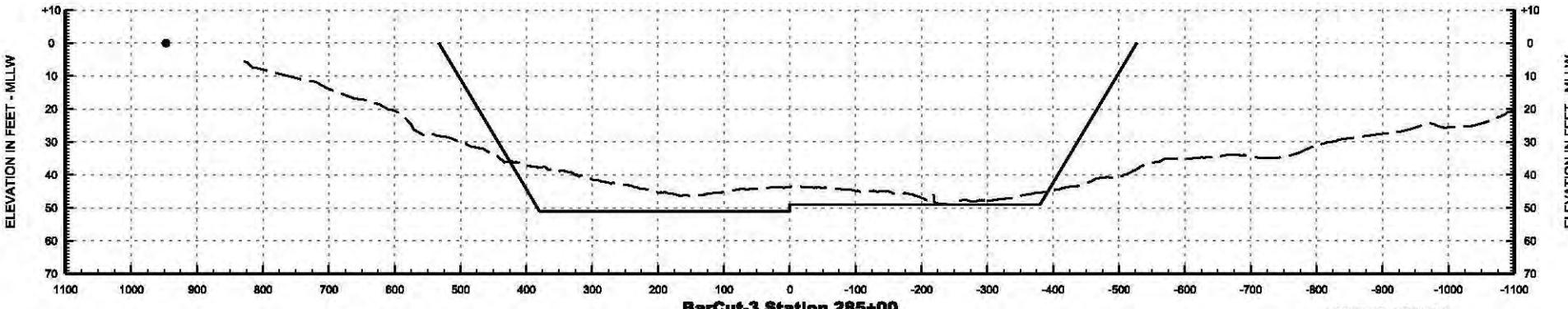
FIGURE  
**39**



BarCut-3 Station 283+00



BarCut-3 Station 284+00



BarCut-3 Station 285+00

#### GRAPHIC SCALES

HORIZONTAL	120'	0	120'	240'
VERTICAL	24'	0	24'	48'



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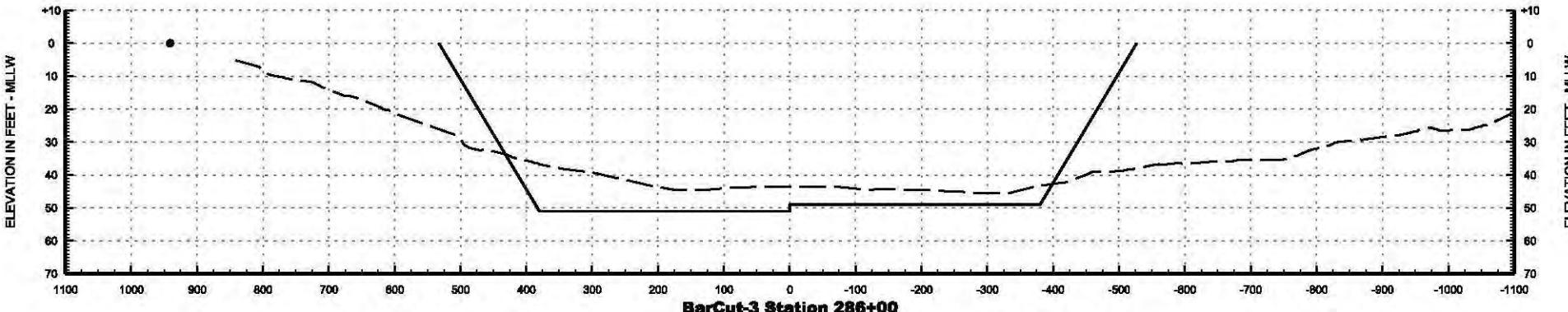
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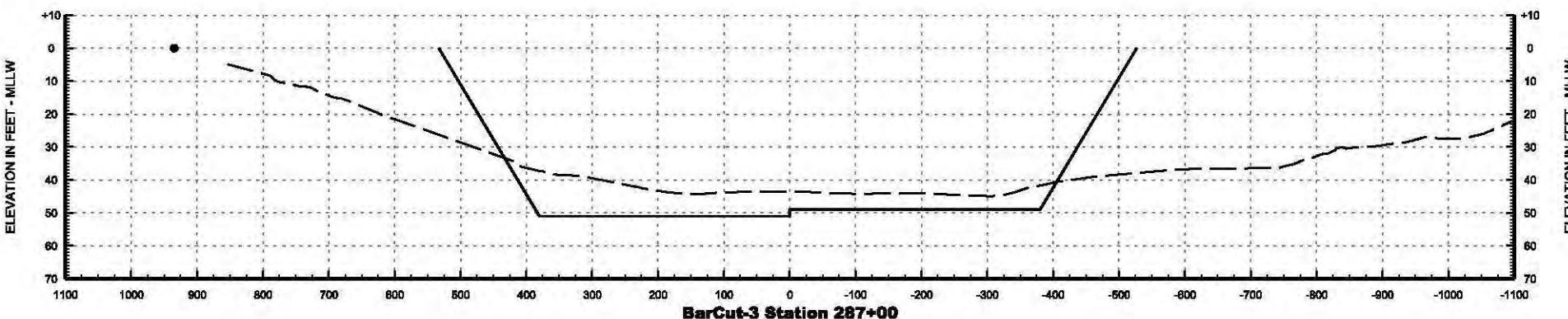
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DUVAL COUNTY, FLORIDA  
DREDGING CROSS SECTIONS  
BARCUT-3 STATION 283+00 TO 285+00  
GENERAL REEVALUATION REPORT II - ENGINEERING APPENDIX

\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

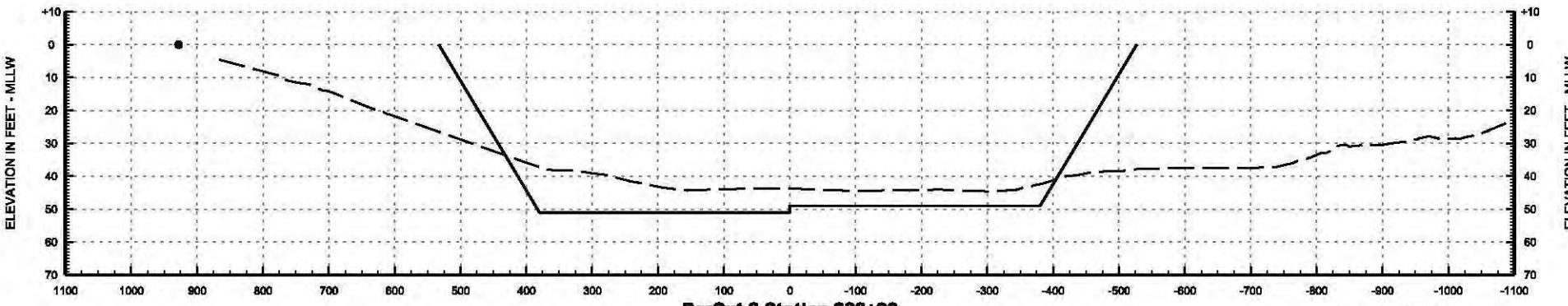
FIGURE  
**40**



BarCut-3 Station 286+00



BarCut-3 Station 287+00



BarCut-3 Station 288+00

GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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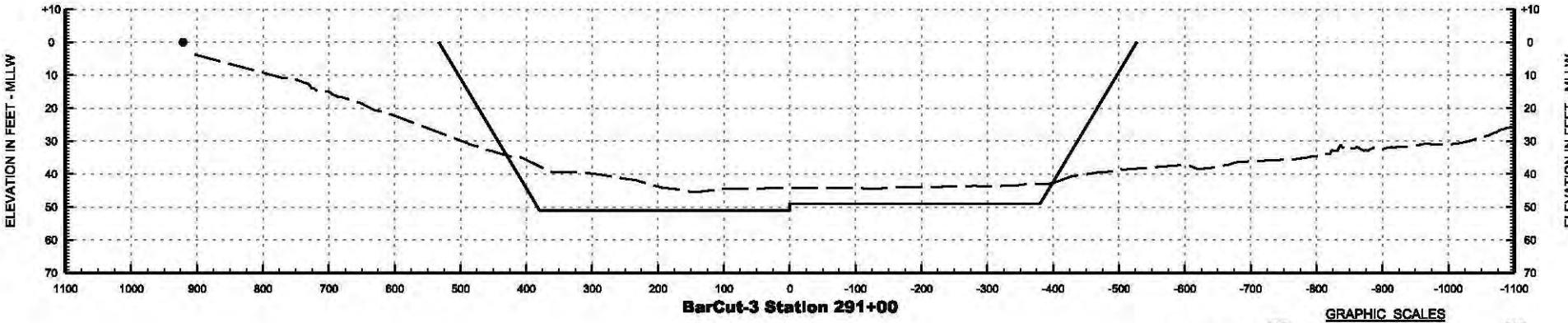
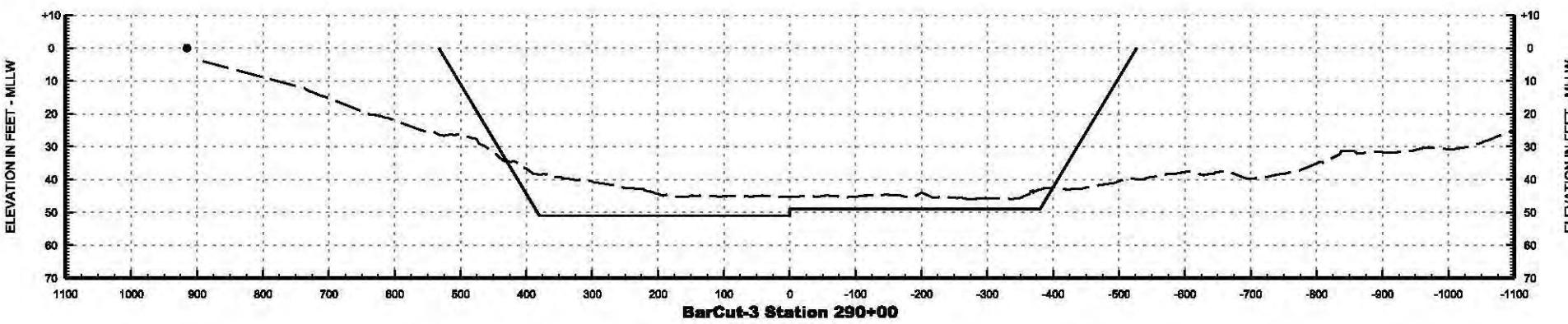
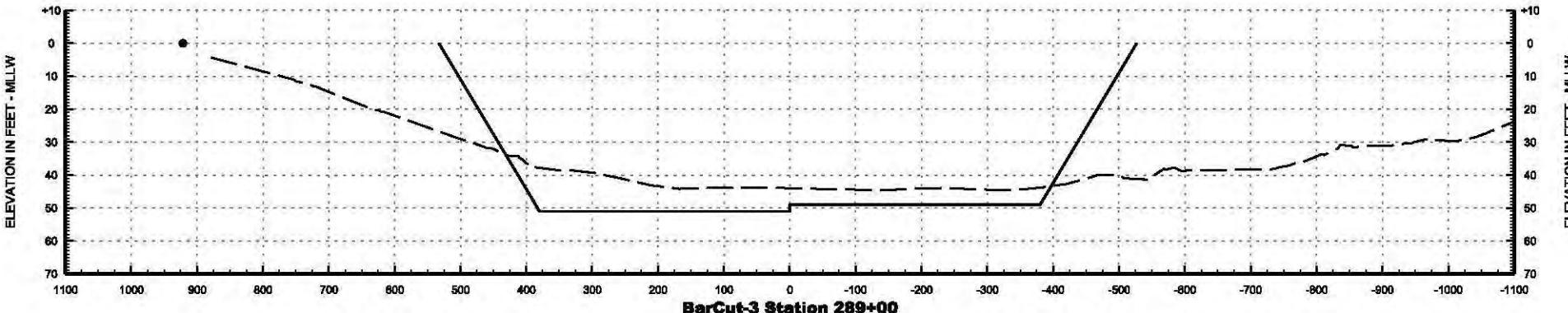
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MARCH 2013

JACKSONVILLE HARBOR NAVIGATION PROJECT  
DUVAL COUNTY, FLORIDA  
DREDGING CROSS SECTIONS  
BARCUT-3 STATION 286+00 TO 288+00  
GENERAL REEVALUATION REPORT II - ENGINEERING APPENDIX

● APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

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FIGURE



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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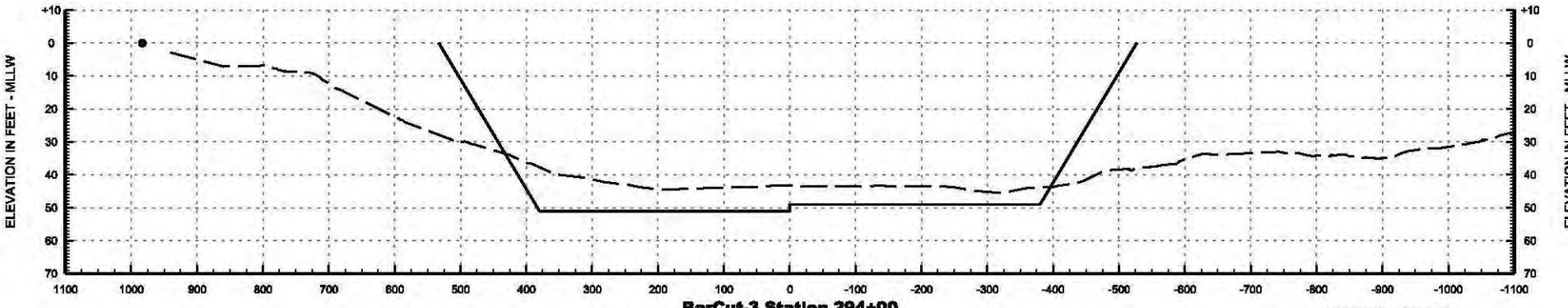
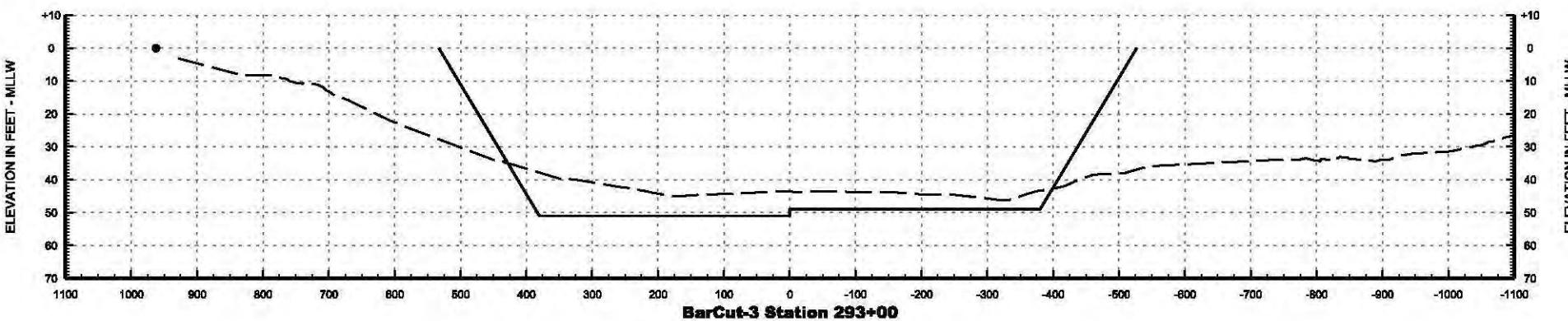
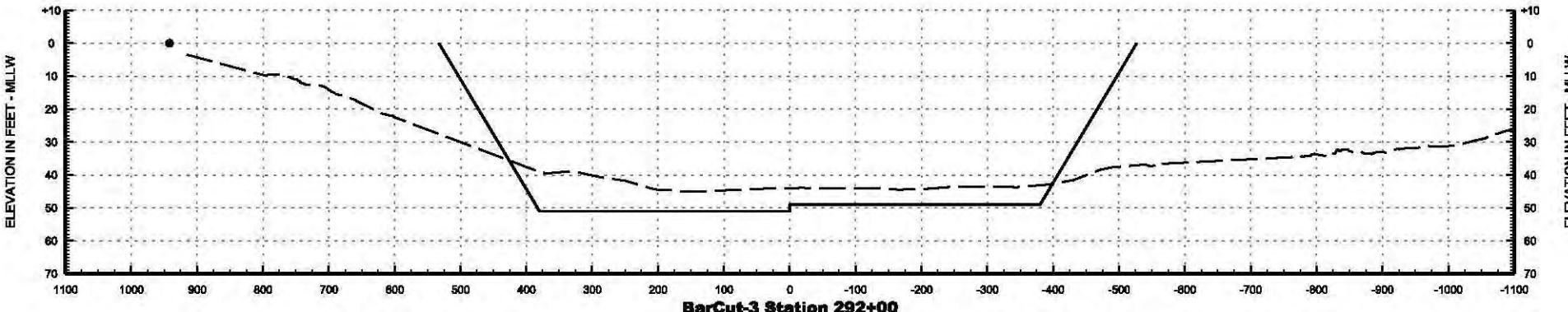
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MARCH 2013

JACKSONVILLE HARBOR NAVIGATION PROJECT  
DUVAL COUNTY, FLORIDA  
DREDGING CROSS SECTIONS  
BARCUT-3 STATION 289+00 TO 291+00  
GENERAL REEVALUATION REPORT II - ENGINEERING APPENDIX

• APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

**42**

**FIGURE**



GRAPHIC SCALES	
HORIZONTAL	120' 0 120' 240'
VERTICAL	24' 0 24' 48'



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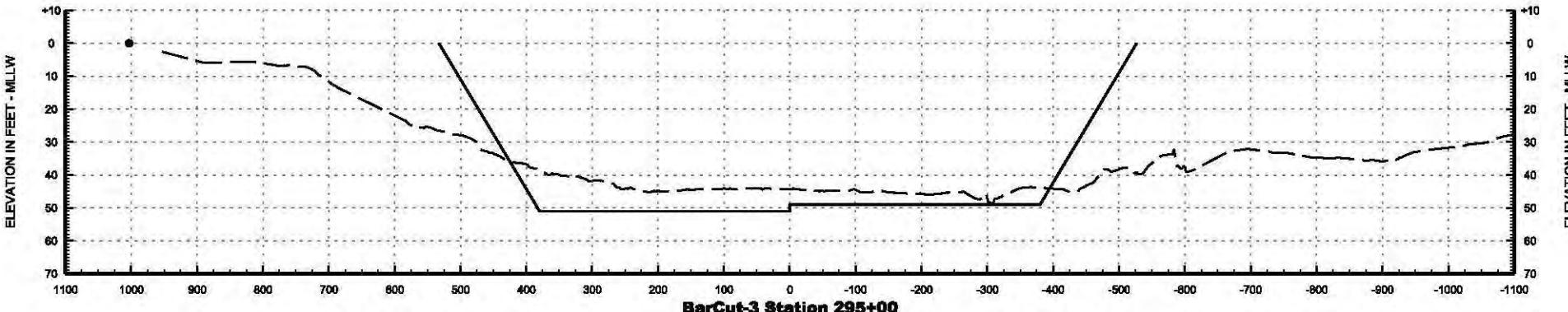
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JACKSONVILLE HARBOR NAVIGATION PROJECT  
DUVAL COUNTY, FLORIDA  
DREDGING CROSS SECTIONS  
BARCUT-3 STATION 292+00 TO 294+00  
GENERAL REEVALUATION REPORT II - ENGINEERING APPENDIX

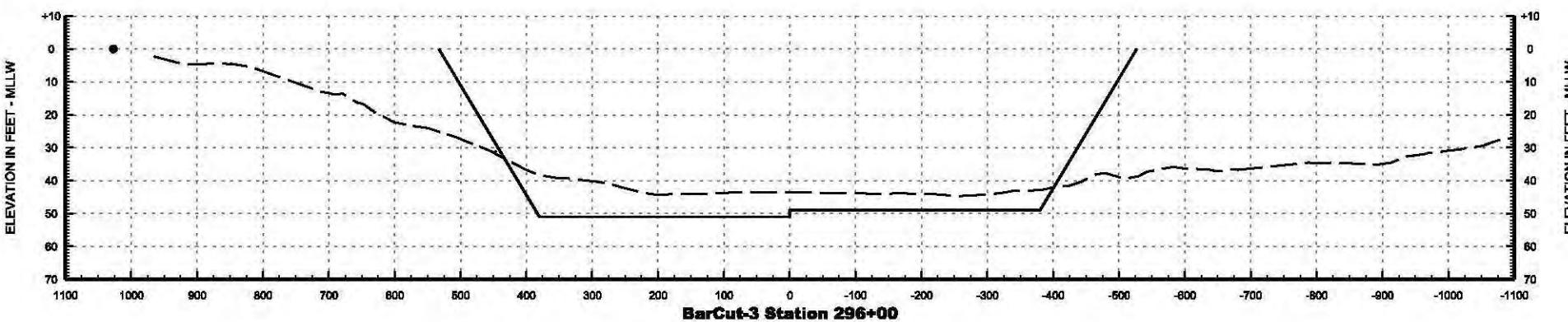
\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

**43**

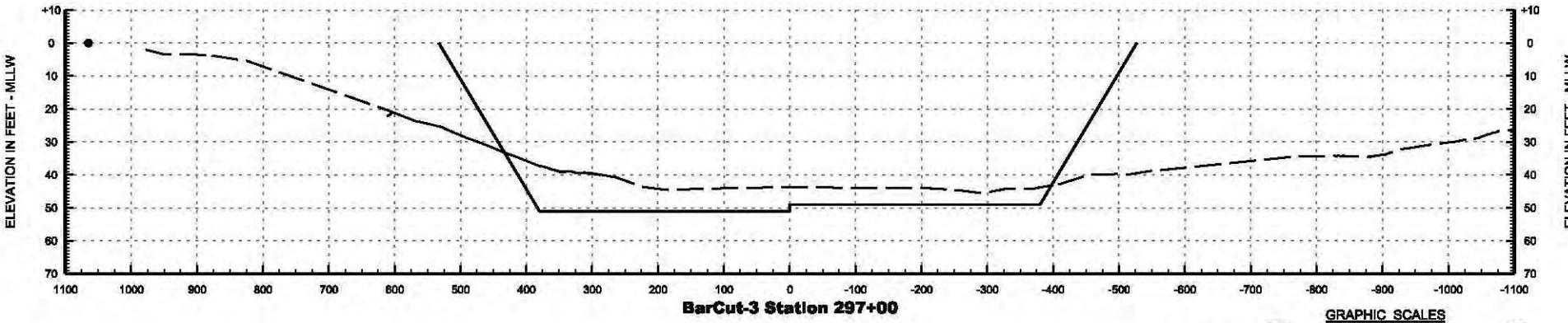
**FIGURE**



BarCut-3 Station 295+00



BarCut-3 Station 296+00



BarCut-3 Station 297+00

GRAPHIC SCALES

HORIZONTAL	120'	0	120'	240'
VERTICAL	24'	0	24'	48'



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JACKSONVILLE, FLORIDA

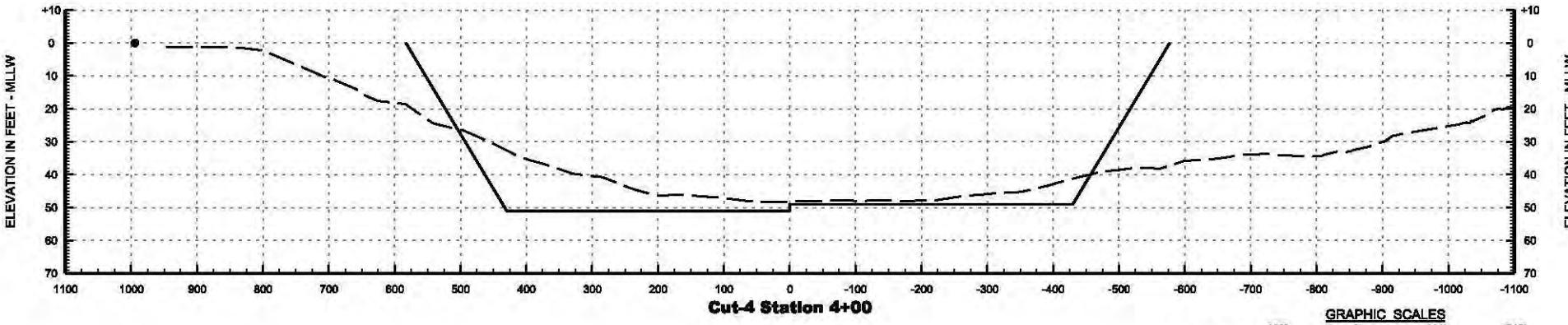
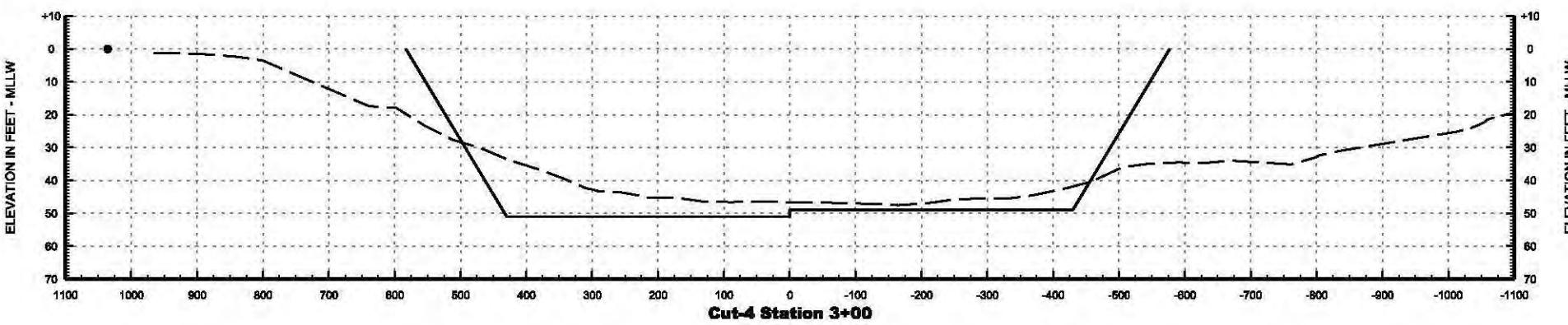
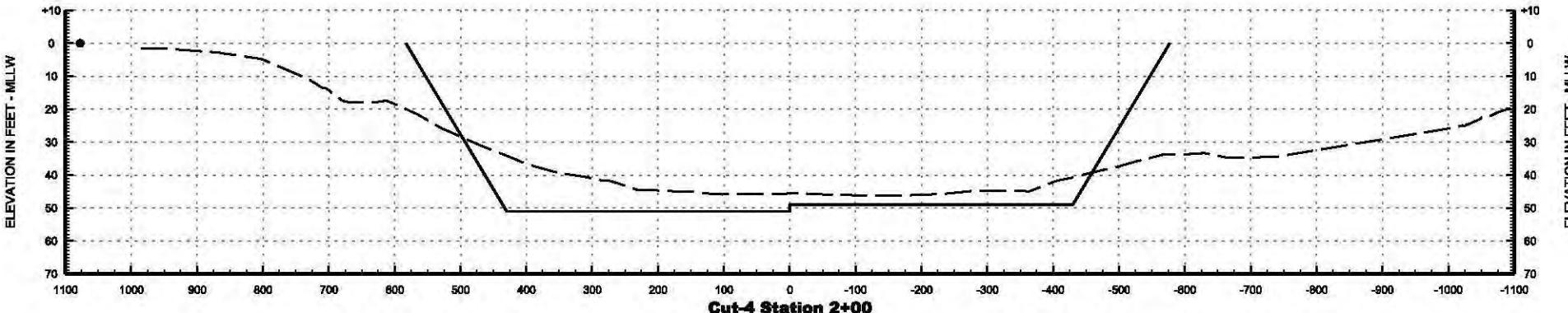
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DATED:  
MARCH 2013

JACKSONVILLE HARBOR NAVIGATION PROJECT  
DUVAL COUNTY, FLORIDA  
DREDGING CROSS SECTIONS  
BARCUT-3 STATION 295+00 TO 297+00  
GENERAL REEVALUATION REPORT II - ENGINEERING APPENDIX

\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

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FIGURE



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JACKSONVILLE, FLORIDA

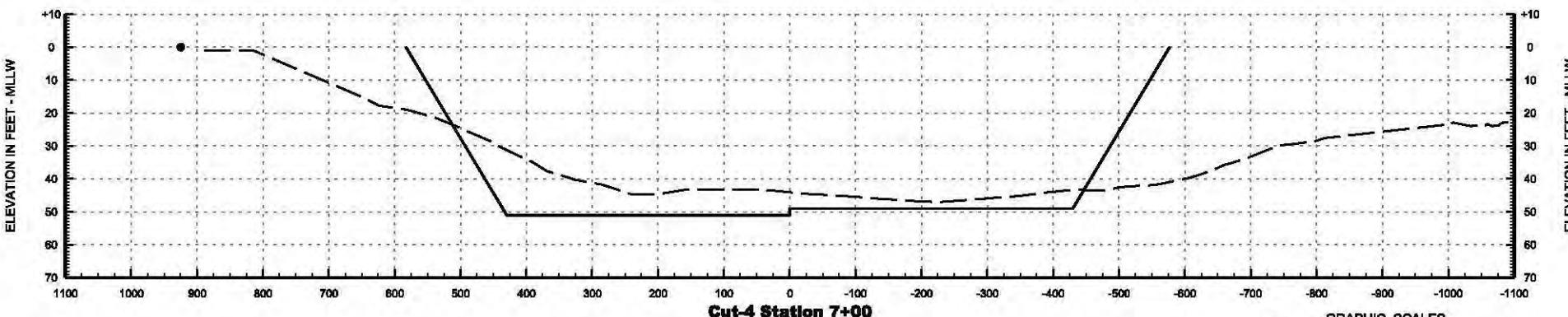
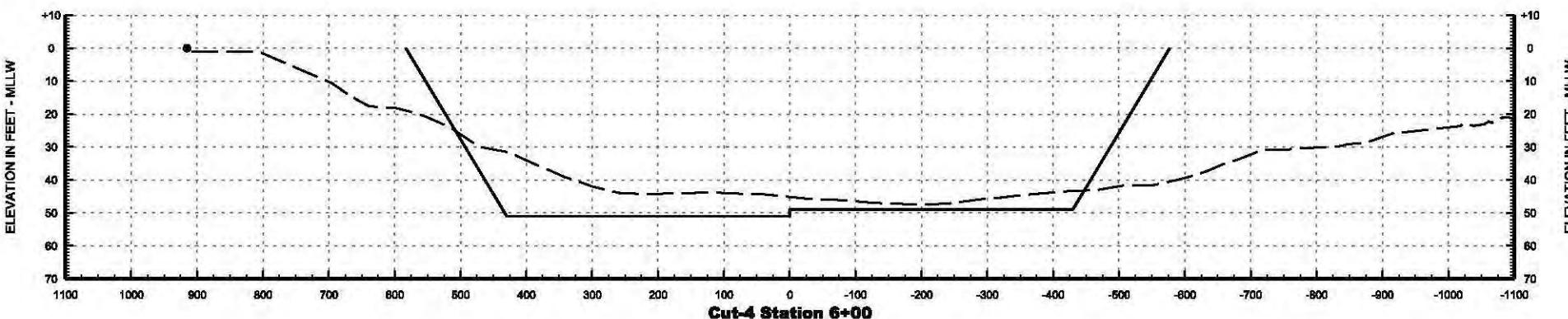
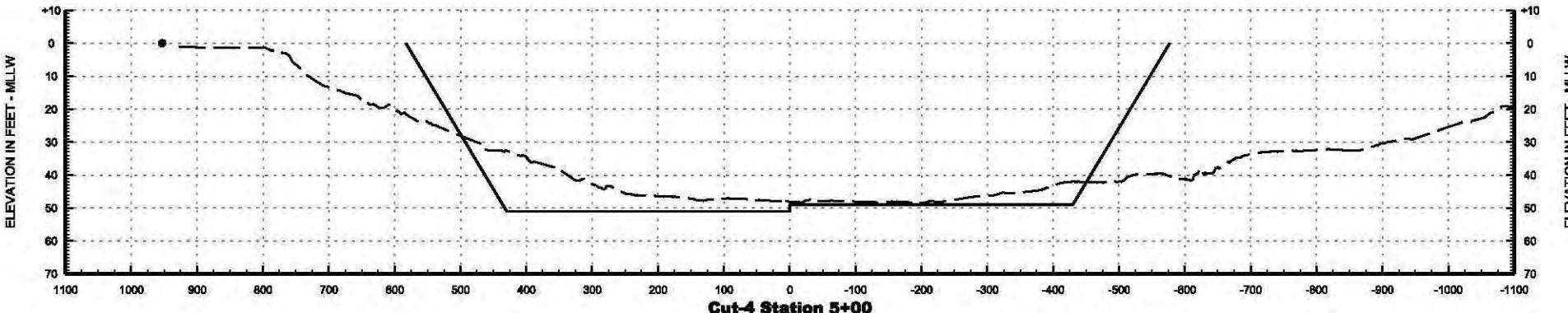
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MARCH 2013

JACKSONVILLE HARBOR NAVIGATION PROJECT  
DUVAL COUNTY, FLORIDA  
DREDGING CROSS SECTIONS  
CUT-4 STATION 2+00 TO 4+00  
GENERAL REEVALUATION REPORT II - ENGINEERING APPENDIX

\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

**45**

**FIGURE**



GRAPHIC SCALES	
HORIZONTAL	120' 0 120' 240'
VERTICAL	24' 0 24' 48'



US Army Corps of Engineers  
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JACKSONVILLE, FLORIDA

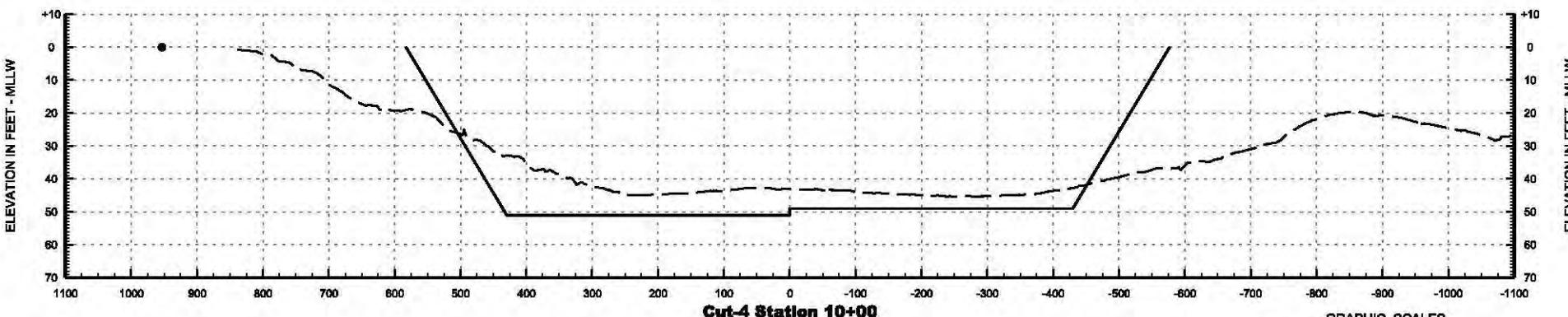
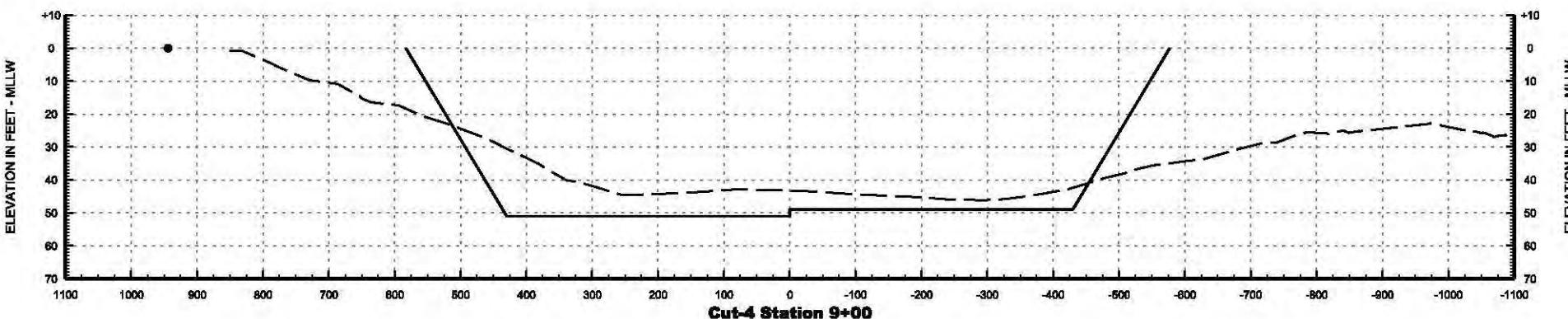
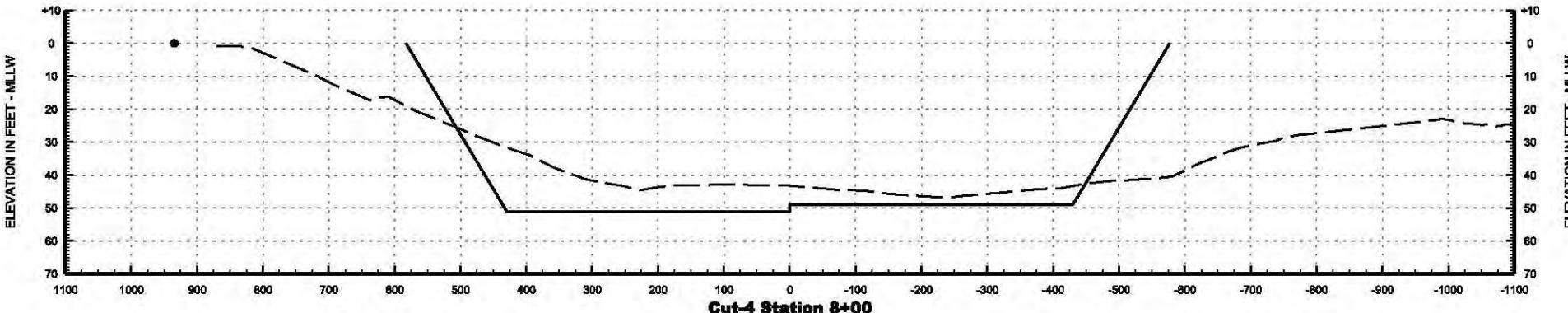
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JACKSONVILLE HARBOR NAVIGATION PROJECT  
DUVAL COUNTY, FLORIDA  
DREDGING CROSS SECTIONS  
CUT-4 STATION 5+00 TO 7+00  
GENERAL REEVALUATION REPORT II - ENGINEERING APPENDIX

\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

**46**

**FIGURE**



GRAPHIC SCALES			
HORIZONTAL	120'	0	120' 240'
VERTICAL	24'	0	24' 48'



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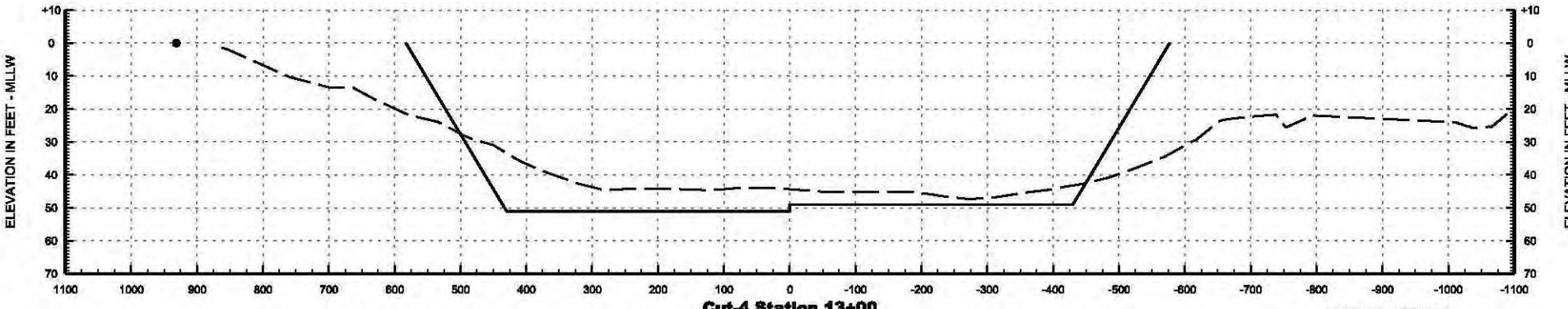
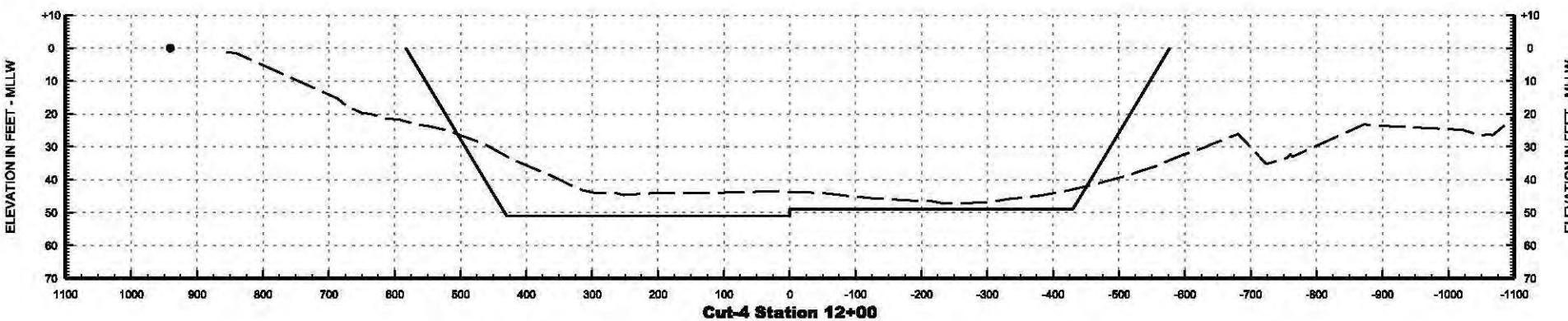
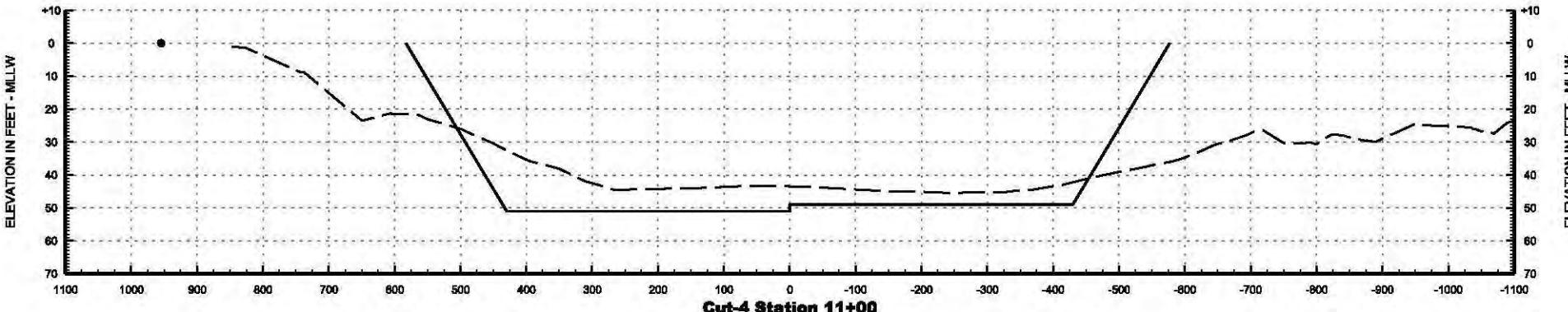
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JACKSONVILLE HARBOR NAVIGATION PROJECT  
DUVAL COUNTY, FLORIDA  
DREDGING CROSS SECTIONS  
CUT-4 STATION 8+00 TO 10+00  
GENERAL REEVALUATION REPORT II - ENGINEERING APPENDIX

● APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

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FIGURE



GRAPHIC SCALES	
HORIZONTAL	120' 0 120' 240'
VERTICAL	24' 0 24' 48'



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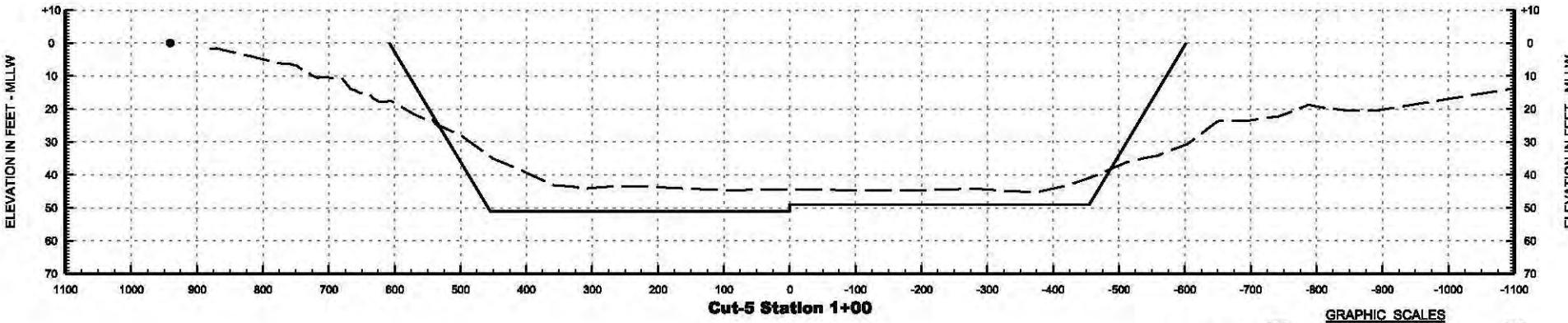
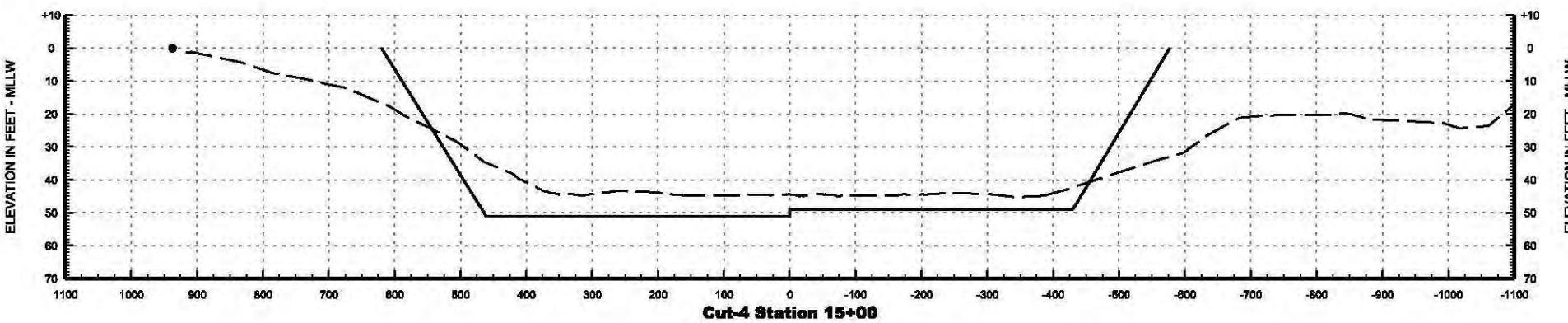
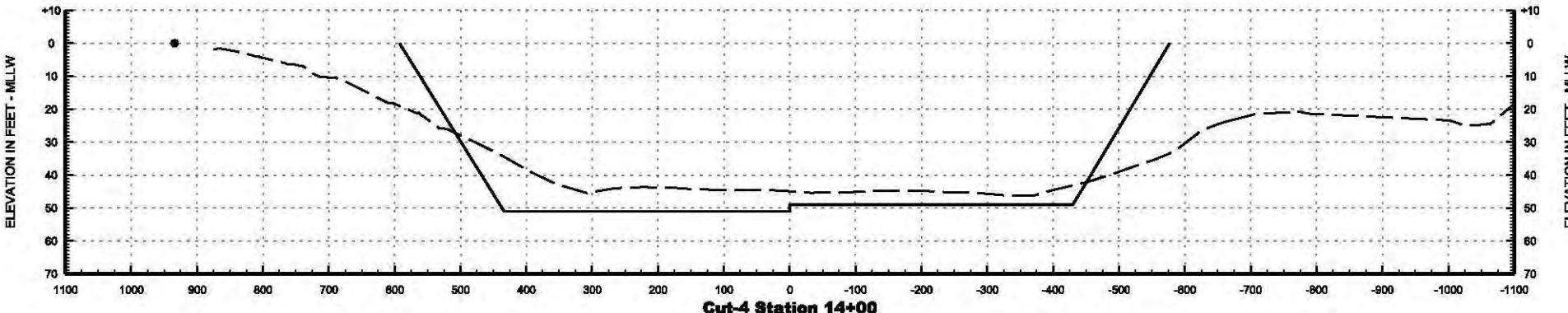
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JACKSONVILLE, FLORIDA

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MARCH 2013

JACKSONVILLE HARBOR NAVIGATION PROJECT  
DUVAL COUNTY, FLORIDA  
DREDGING CROSS SECTIONS  
CUT-4 STATION 11+00 TO 13+00  
GENERAL REEVALUATION REPORT II - ENGINEERING APPENDIX

• APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

FIGURE  
**48**



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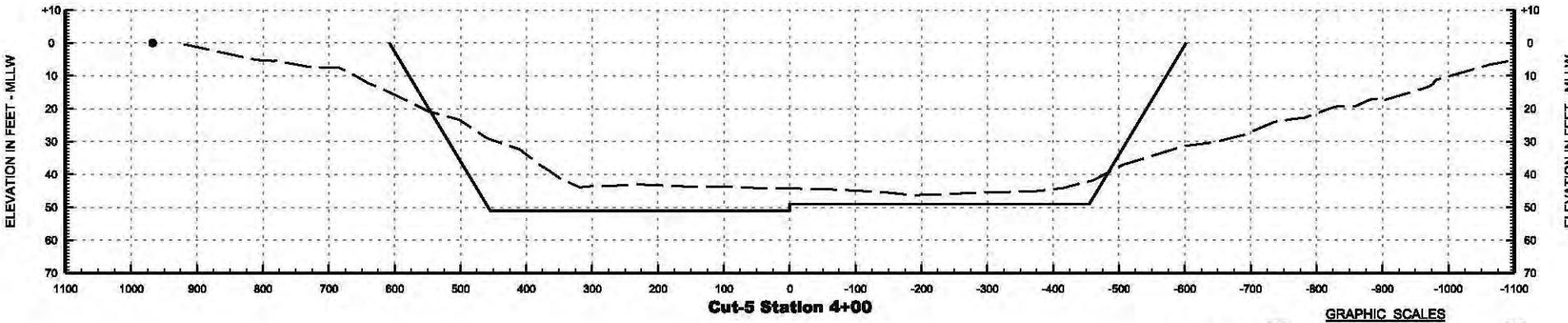
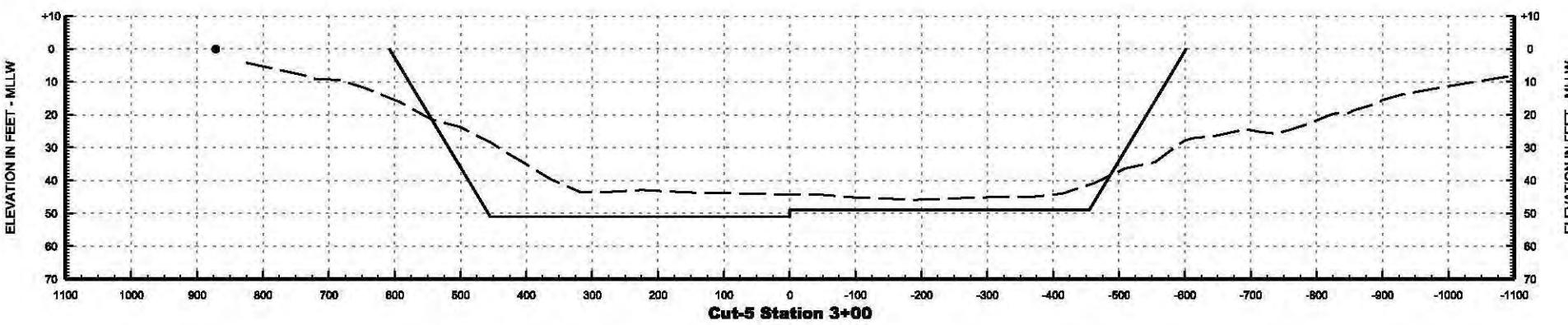
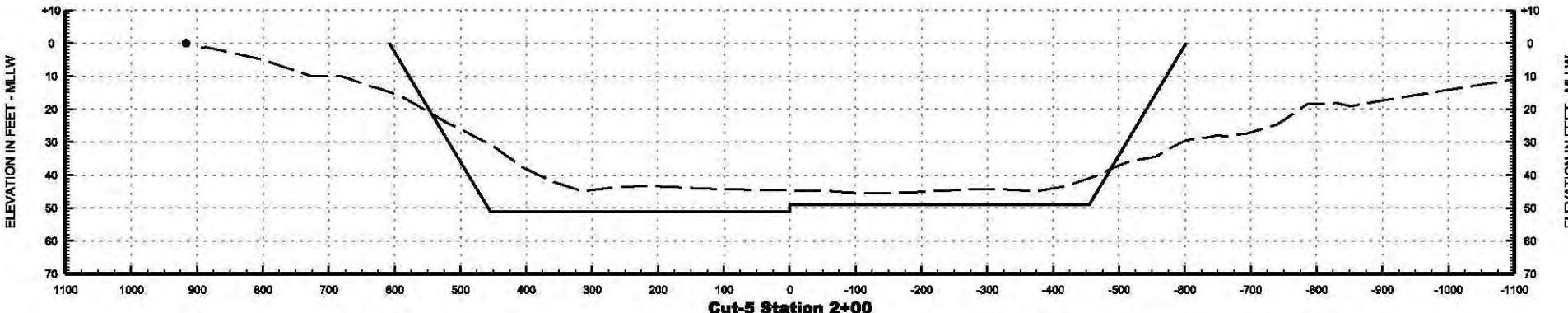
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MARCH 2013

JACKSONVILLE HARBOR NAVIGATION PROJECT  
DUVAL COUNTY, FLORIDA  
DREDGING CROSS SECTIONS  
CUT-4 STATION 14+00 TO CUT-5 STATION 1+00  
GENERAL REEVALUATION REPORT II - ENGINEERING APPENDIX

\* APPROXIMATE SHORELINE  
— EXISTING GROUND  
— DREDGE TEMPLATE  
NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.

**49**

**FIGURE**



HORIZONTAL	120'	0	120'	240'
VERTICAL	24'	0	24'	48'

● APPROXIMATE SHORELINE  
 — EXISTING GROUND  
 — DREDGE TEMPLATE  
 NOTE: SHORELINE FALLS OUTSIDE LIMITS OF SECTION ON SECTIONS WHERE APPROXIMATE SHORELINE SYMBOL IS NOT SHOWN.



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JACKSONVILLE HARBOR NAVIGATION PROJECT  
DUVAL COUNTY, FLORIDA  
DREDGING CROSS SECTIONS  
CUT-5 STATION 2+00 TO 4+00  
GENERAL REEVALUATION REPORT II - ENGINEERING APPENDIX

**FIGURE**  
**50**